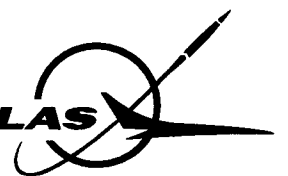


MCDONNELL DOUGLAS



Douglas Aircraft Company

DOUGLAS AIRCRAFT COMPANY
TORRANCE (C6) FACILITY
PRELIMINARY PHASE III
GROUNDWATER AND SOIL
INVESTIGATION REPORT

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**DOUGLAS AIRCRAFT COMPANY'S
TORRANCE (C6) FACILITY
PRELIMINARY PHASE III
GROUNDWATER AND SOIL INVESTIGATION REPORT**

1.0 INTRODUCTION

The purpose of this report is to present the results of Task I and IA of the Phase III groundwater and soil investigation at the Douglas Aircraft Company's Torrance (C6) facility. The C6 facility is located at 19503 South Normandie Avenue in Los Angeles, California (Figure 1). Woodward-Clyde Consultants (Woodward-Clyde) has conducted two previous investigations (1987 and 1988) in the area of Tank Cluster 15T through 18T. The results from these investigations identified this tank cluster as a potential source of volatile organic compounds (VOCs) identified in the groundwater. Additional background information and analytical results from these earlier Woodward-Clyde investigations can be found in the reports submitted to the California Regional Water Quality Control Board (CRWQCB), Los Angeles Region dated April 1987 and 10 May 1988.

2.0 SCOPE AND OBJECTIVES

The specific scope and objectives of the Phase III groundwater and soil investigation are outlined below. Objectives were to:

1. Evaluate the quality of the groundwater entering the site in the apparent hydraulic upgradient direction of Tanks 15T through 18T.
2. Assess the lateral and vertical extent of VOCs in the groundwater in the vicinity of Tanks 15T through 18T.

3. Evaluate the potential for offsite migration of VOCs in the groundwater.
4. Obtain quantitative estimates for aquifer parameters in the shallow and deep zones within the semi-perched aquifer (to depths of 130 to 150 feet). These parameters are required for design of a remedial program.
5. To estimate the lateral and vertical extent of VOCs in the soil around Tank Cluster 15T through 18T.

These objectives were accomplished using an approach comprised of the following tasks:

- o Task I - Installation of five shallow (70 to 90 feet) observation wells (WCC-6S, -7S, -8S, -9S, and -10S) and two deep (120 to 140 feet) observation wells (WCC-1D, and -3D). In addition, Task I involved advancing four soil borings in the vicinity of Tank Cluster 15T through 18T.
- o Task IA - Slug testing of five shallow wells and two deep wells.
- o Task III - Aquifer testing.
- o Task IV - Evaluation of data and report preparation.

The background for this investigation and a description of the tasks is described in Woodward-Clyde's work plan approved by the CRWQCB entitled "Douglas Aircraft Company Torrance (C6) Facility Phase III Ground Water and Soil Investigation Work Plan," dated 9 February 1989. This report presents the results obtained to date from Tasks I, IA, III and IV. No Task II wells had been installed at the time this report was prepared. Task II wells were not considered necessary at this time, for this phase of investigation, based on results from Task I wells.

2.1 Task I

The work performed during Task I involved advancing four soil borings (B-6, -7, -8, and -9), each to a depth of approximately 65 feet, around Tank Cluster 15T through 18T, to evaluate the extent of VOCs in this area. This task also involved installing wells at two depths in the upper water-bearing unit called the semi-perched aquifer. The upper zone wells are screened from 60 to 90 feet below ground surface, with the static water level at approximately 70 feet below ground surface. These upper zone wells will henceforth be referred to as "shallow" wells. The lower zone wells are screened from 120 to 140 feet below ground surface. The lower zone wells will henceforth be referred to as "deep" wells. The installation of observation wells within the upper and lower zones of the semi-perched aquifer was designed to evaluate differences in vertical gradient and concentrations of VOCs within the semi-perched aquifer. Observation Wells WCC-1D, -3D, -6S, -7S, -8S, -9S, and -10S have been installed in accordance with Task I of the work plan. The observation well locations are shown on Figure 2. Task I also included development of the observation wells, and the collection and analysis of groundwater samples. Wells WCC-1S through WCC-5S had been installed during an earlier phase of work.

2.2 Task IA

The objective of Task IA was to conduct slug tests on six shallow wells and two deep observation wells to provide preliminary estimates of hydraulic conductivity in the shallow and deep zones of the semi-perched aquifer. These data have been used in estimating groundwater velocity and the distribution of VOCs in the groundwater within the subject area.

2.3 Task III

Woodward-Clyde conducted a pump test at the Torrance facility to observe the response of the semi-perched aquifer to hydraulic stresses created by pumping.

3.0 FIELD PROGRAM

3.1 Soil Boring Installation

Four soil borings, B-6, -7, -8, and -9, were drilled around Tank Cluster 15T through 18T, as shown on Figure 2. Each soil boring was drilled to a depth of 66.5 feet below ground surface. The purpose of the borings was to assess the vertical and horizontal extent of VOCs in the vadose zone soil in the vicinity of the tanks. Borings B-6 and B-7 were placed along the south side of the tanks, while Borings B-8 and B-9 were placed about 40 feet away, to the east and north of the tanks, respectively.

Field procedures used for drilling and sampling activities are described in Appendix A. The lithologic boring logs from B-6, -7, -8, and -9 are presented in Appendix B. The results of soil sample analyses from these borings are presented in Section 4.4.

3.2 Observation Well Installation

Seven observation wells were installed during Task I of this investigation, as previously discussed in Section 2.1. Five of the wells were completed to a depth of 90 feet, and two were completed to a depth of 140 feet. The locations of these wells are shown on Figure 2 and the procedures involved in the installation are described in Appendix A.

Of the five shallow wells, the first, WCC-10S was completed near the northwest corner of the property. This location was chosen to provide information on the quality of

groundwater entering the site. The second and third wells, WCC-7S and -8S, were installed downgradient of Tank Cluster 15T-18T to assist in evaluating the lateral extent of VOCs in the groundwater. Observation Well WCC-7S was placed about 160 feet south of WCC-4S, and WCC-8S was placed approximately 125 feet north of WCC-1S. These locations were chosen considering variations in the direction of groundwater flow (southeast) previously measured at the site, and the concentration level of VOCs in WCC-1S, -3S, and -4S.

The two deep wells were installed to assess the possibility of VOCs migrating vertically downward into the lower zone of the semi-perched aquifer. Well WCC-3D was installed approximately 30 feet east of the tank cluster, and WCC-1D was completed about 190 feet east-southeast of WCC-3D, next to WCC-1S. These wells were also installed to evaluate the differences in hydraulic conductivity between the deep and the shallow zones of the aquifer.

As proposed in the Phase III work plan, Wells WCC-6S and WCC-9S were installed after receiving chemical analysis results from the three initial shallow observation wells (i.e., WCC-7S, -8S, and -10S). Because the results indicated VOCs were present at elevated concentrations in WCC-7S, Wells WCC-6S and WCC-9S were installed in locations which could intercept a more south to southeast path of migration than the wells previously installed.

3.3 Observation Well Slug Testing

Task IA involved conducting slug tests on six shallow wells, and two deep wells, to obtain estimates of horizontal hydraulic conductivity (k) values in the immediate vicinity of the six wells for the shallow and deep zones. Slug tests were completed on shallow Wells WCC-4S, -5S, -7S, -8S, -9S,

and -10S. Two deep wells WCC-1D and WCC-3D were also slug tested. Testing dates were 19 July, 31 August, and 4 October 1989. An Envirolabs Data Logger, model DL-120-MCP equipped with a pressure transducer was used for raw data collection. Slugs of water being introduced and withdrawn from each well were simulated by volume displacement using a 39-inch-long, 3.25-inch-diameter mandrel constructed of PVC pipe and plugs, and filled with silica sand. The slug test procedures and subsequent data analysis are described in Appendix A, while the slug test results are discussed in Section 4.2.

3.4 Pump Test

As part of Task III of this investigation, Woodward-Clyde conducted a 30-hour, constant discharge pumping test on 20 through 21 December 1989 at the Torrance (C6) facility. Well WCC-4S was pumped using a 1-1/2 horsepower submersible pump. Observation wells included WCC-1S, -4S, -6S, -7S, -8S, -9S, and -1D. Five of the wells were automatically monitored for water level using three Terra-8 data loggers equipped with a total of five pressure transducers. In addition water levels were measured at regular intervals for all of the wells except WCC-1S, -1D, and -4S (monitored by data logger), using a Solonist electrical well sounder. Water level monitoring continued from the time the pump was switched on until two hours after the pump was switched off. The pump test procedures and the subsequent data analysis are described in Appendix A and the pump test results are discussed in Section 4.3.

4.0 RESULTS

4.1 Geology

The general description of shallow (less than 90 feet below ground surface) geologic deposits beneath the site was

4.2 Slug Testing Results

Results from slug testing of Observation Wells WCC-4S, -5S, -7S, -8S, -9S, -10S, -1D, and -3D, including the data reduction, are summarized in Table 1. Hydraulic conductivity values ranged from 24 to 140 gallons per day per square foot (gpd/ft²) in the shallow wells. These values are typical of the sandy silts and silty sands encountered during drilling in the shallow water bearing zones of the semi-perched aquifer. The calculated hydraulic conductivity values were 21 gpd/ft² for WCC-1D and 6.6 gpd/ft² for WCC-3D.

4.3 Pump Test Results

The pump test data from each well showing a discernible response were analyzed using one or more of the following techniques: Recovery (Residual Drawdown) plot, Cooper-Jacob Time Drawdown plot, and/or Distance/Drawdown plot. A summary of the results is presented in Table 2. Slug test values obtained earlier are included for reference.

The hydraulic conductivity value derived from the pump test at the pumping well, WCC-4S, was 470 gpd/ft² based on analyses of recovery data (residual drawdown). This compares favorably with the pump test values calculated by both the Cooper-Jacob method and the Distance Drawdown method using data from the surrounding observation wells. Overall, the calculated hydraulic conductivity values vary within a factor of two (see Table 2). Local variations in stratigraphy can easily account for this level of variability.

The conductivity values calculated from the slug tests are not directly comparable with conductivity values calculated from the pump test, since the former only tests the portion of the aquifer immediately adjacent to the well screen,

while the pump test stresses a much larger volume of the aquifer. Overall the slug test hydraulic conductivity values are roughly on an order of magnitude lower than the pump test values. This level of variability is not surprising given that the specific assumptions and mechanics of the two test techniques are remarkably different.

Variations in the storage coefficients are somewhat greater than those for transmissivity. Fairly wide variations in the calculated storage coefficient are not unusual and, in general, have a minimal impact on the calculated yield.

4.4 Groundwater Gradient and Velocity

The groundwater gradient was calculated from the groundwater elevation data collected on 18 October 1989 (see Table 3), using Equation 1-1 as follows:

$$I = \frac{h_1 - h_2}{L} \quad (1-1)$$

Where:

I = Gradient (ft/ft)

h_1 = Upgradient groundwater contour elevation (feet)

h_2 = Downgradient groundwater contour elevation (feet)

L = Distance between groundwater contours (feet)

Based on groundwater level data of 18 October 1989, the gradient across the C6 facility appears to be south to southeast as shown on Figure 3. The gradient was calculated using the assumption that all water bearing strata in this

area act as one hydrogeologic unit. This assumption is considered valid for preliminary evaluation of flow velocity and the extent of VOCs in the groundwater.

A gradient of 0.002 towards the south-southeast was calculated using Equation 1-1.

The groundwater velocity was calculated from Darcy's equation:

$$V = \frac{KI}{7.48 n_e} \quad (1-2)$$

Where:

- V = Groundwater velocity (feet per day)
- K = Hydraulic conductivity of the media based on slug test values calculated in Section 4.3 (gal/day/ft²)
- I = Groundwater gradient calculated from Equation 1-1
- 7.48 = The number of gallons of water per cubic foot
- n_e = Effective porosity of the saturated media

Assuming:

- K = 715 gal/day/ft² for shallow wells
NOTE: The hydraulic conductivity value used in the calculation was the average of the values obtained from all the pump test analytical methods used.
- I = 0.002 ft/ft calculated from Equation 1-1
- n_e = 0.30 for silty fine-grained sand.

Based on the calculations and assumptions above, the groundwater velocity is approximately 0.64 feet per day or 234 feet per year in the shallow zone of the semi-perched aquifer.

There does not appear to be a significant vertical groundwater gradient between the shallow and deep aquifers. The approximately equal static groundwater levels measured in the associated shallow and deep observation wells WCC-1S and -1D, and WCC-3S and -3D, indicate the major component of groundwater flow is horizontal.

4.5 Soil Sampling and Analytical Results

Soil samples were collected from all the observation wells and soil borings installed during the field program as described in Appendix A. Samples which had elevated OVA headspace readings and which were in close proximity to tank Cluster 15T through 18T, as well as samples from WCC-6S, were selected for analytical testing. Soil samples at selected depths from B-6, B-7, B-8, B-9, and WCC-6S were analyzed by EPA Method 8240 at West Coast Analytical Service (WCAS) in Santa Fe Springs. A summary of results is presented in Table 4, while the analytical data sheets provided by WCAS, and chain-of-custody forms are presented in Appendix C.

The soil sampling results show low concentrations of organic compounds present in most of the borings installed around tank cluster 15T through 18T. Boring B-6 seems to be located near the source of the release. At this location the soil column contained elevated levels of organic compounds beginning at a depth of 20 feet and continuing down to at least 60 feet. At the other boring locations the organic compound concentrations became elevated at depths of 40 feet or more. Both halogenated and nonhalogenated

compounds are present at location B-6, with the higher concentrations of each present at a depth of 20 feet. Toluene was the dominant nonchlorinated hydrocarbon present while 1,1,1-trichloroethane (1,1,1-TCA) and trichloroethylene (TCE) were the dominant chlorinated hydrocarbons. At Boring B-7, which is located about 30 feet east of Boring B-6, a similar mix of compounds is present, however, their concentrations are at a greater depth in the boring. The highest concentrations of compounds are present at a depth of 60 feet, with methylene chloride identified in the soil for the first time at this depth. Samples from Boring B-8, which is located east of the tank cluster, also contained low (<1 ppm) concentrations of compounds except for toluene, which was present at 25 ppm at a depth of 65 feet. Samples from Boring B-9, which is north of the tank cluster, also contained low concentrations of compounds at depth (generally less than 1 ppm).

Three samples collected at, and just below, the water table from the borehole in which Well WCC-6S was installed, contained low concentrations of MEK (9.4 ppm), MIBK (8.4 ppm), toluene (1 ppm), and a compound tentatively identified as butyl cellosolve (0.3 ppm).

4.6 Groundwater Sampling and Analytical Results

During this task, two rounds of groundwater samples were collected and analyzed during July and August from monitoring Wells WCC-1D, -3D, and -1S through -10S, except WCC-6S and WCC-9S. These two wells were the most recently installed, and water sampling was completed the first week in October. The procedures used during these sampling efforts are described in Appendix A.

All of the water samples tested, including groundwater samples, duplicates, rinse blanks, and trip blanks, were analyzed for VOCs by EPA Method 624 by WCAS. For the first round of sampling, one sample from each well, two duplicate samples, three rinse blanks, and one trip blank were analyzed. Analysis of water samples from the second round included one sample from each well, two rinse blanks, and one trip blank.

The groundwater analytical results are summarized in Table 5. Analytical data sheets provided by WCAS, and chain-of-custody forms are attached in Appendix C.

The data indicate that of the 10 shallow wells sampled at the facility only WCC-2S, located upgradient to the northwest of Tanks 15T through 18T, -5S, and -9S, both located along the eastern boundary of the site, contained total VOCs at or below 30 ppb, predominantly TCE. One well, WCC-10S, contained TCE at about 80 ppb and less than 5 ppb of chloroform. The other six shallow wells all contained a similar mix of VOCs, with the dominant compounds being TCE, 1,1-dichloroethene (1,1-DCE), and 1,1,1-TCA, with lower concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) also present.

The deep well closest to the tank cluster (WCC-3D) contained 1,1,1-TCA at concentrations of around 50 ppb on the first occasion the well was sampled. Trace amounts of TCE, toluene, and cis-1,2-DCE were also present. When the well was resampled one month later only 1,1,1-TCA was detected, but the detection limits were ten times higher for the other compounds measured in the first round of sampling because of a laboratory error. Samples from the other deep well

(WCC-1D), contained low concentrations of 1,1,1-TCA (1 ppb), TCE (2 ppb), and cis-1,2-DCE (1 ppb). The total VOC concentration in Well WCC-1D was less than 10 ppb.

The water quality data collected to date indicate the presence of TCE in the groundwater (Well WCC-10S) entering DAC's Torrance (C6) facility. The TCE concentration was measured at approximately 80 ppb, nearly an order of magnitude higher than the TCE concentration in Well WCC-2S, upgradient of Tanks 15T through 18T, and Wells WCC-5S and -9S at the downgradient boundary of the site. Wells WCC-7S and WCC-8S are located south and north, respectively, of the previously identified area of groundwater containing VOCs. Concentrations of VOCs in these two wells are greater than the concentrations in the upgradient well, WCC-2S, indicating that the north-south extent of the organic compounds in the groundwater has not been fully established.

5.0 EVALUATION OF GROUNDWATER TREATMENT OPTIONS

Concurrent with field investigations performed by Woodward-Clyde at the Torrance facility, an evaluation was made of treatment options for groundwater containing chlorinated and non-chlorinated hydrocarbons at the site. It was originally the intent of Douglas Aircraft Company to conduct a pilot evaluation of groundwater treatment systems using water produced during the pump test at the site. However, the quantity of water produced during the pump test was not enough for pilot tests, and so bench scale evaluation will be conducted. The tests will be conducted on some of the systems described in the following sections.

5.1 Description of Treatment Options

There are many treatment systems for the removal of organic compounds from groundwater. Three of these systems are:

- o Activated Carbon Adsorption
- o Air/steam Stripping
- o Oxidation

Woodward-Clyde assumed a flow rate of 50 gallons per minute (gpm) and organic concentrations at the levels found in WCC-4S for the characteristics of the influent in this treatment evaluation. The effluent organic concentrations assumed for this evaluation were the California State Action Levels.

5.1.1 Activated Carbon Adsorption

The process of adsorption onto activated carbon involves contacting the organic contaminated groundwater with the carbon, by flow through a series of packed bed reactors. The activated carbon selectively adsorbs chemical constituents by a surface attraction phenomenon in which organic molecules are attracted to the internal pores of the carbon granules.

Once the micropore surface are saturated with organics, the carbon is "spent" and must be replaced with regenerated or virgin carbon. The time to reach "breakthrough" or exhaustion is the most critical operating parameter. Carbon longevity balanced against influent concentrations governs the operating economics.

5.1.2 Air Stripping

Air or steam stripping is a mass transfer process in which organic constituents in groundwater are transferred to the gas phase (in air/steam). Air or steam stripping is frequently accomplished in a packed tower equipped with an air blower. The packed tower works on the principle of countercurrent flow. The influent water flows down through

the packing, while the air/steam flows upward, and is exhausted through the top. Volatile, soluble components have an affinity for the gas phase and tend to leave the aqueous stream for the gas phase. The gas phase effluent must be controlled. This is usually accomplished by using a carbon scrubber for air stripping and a vapor condenser followed by product-water separator for steam stripping.

Woodward-Clyde reviewed the Ejector System, Inc. cascade air stripping. This system is designed to accommodate field changes by allowing for the addition or subtraction of cascade tray modules as conditions dictate. The system is low profile and units are typically shipped completely assembled. Other systems, such as the Aquadetox process, use the same basic principles.

5.1.3 Oxidation

Treatment of groundwater using oxidation is not a new process. New applications using hydroxyl radicals as the oxidizing agent are now available. These radicals can be produced by: ultraviolet (UV) light, hydrogen peroxide, and/or cavitation reactions. Organic constituents are oxidized to carbon dioxide and water by the hydroxyl radicals.

Two types of oxidation systems which Woodward-Clyde evaluated were the CAV-OX process and the Perox-pure process. The CAV-OX process uses induced cavitation and UV light to allow oxidation to occur. The Perox-pure system uses hydrogen peroxide and UV light to cause the oxidation process.

Representatives from each of the vendors expressed the need for bench scale testing in order to better estimate the operation and maintenance costs associated with their

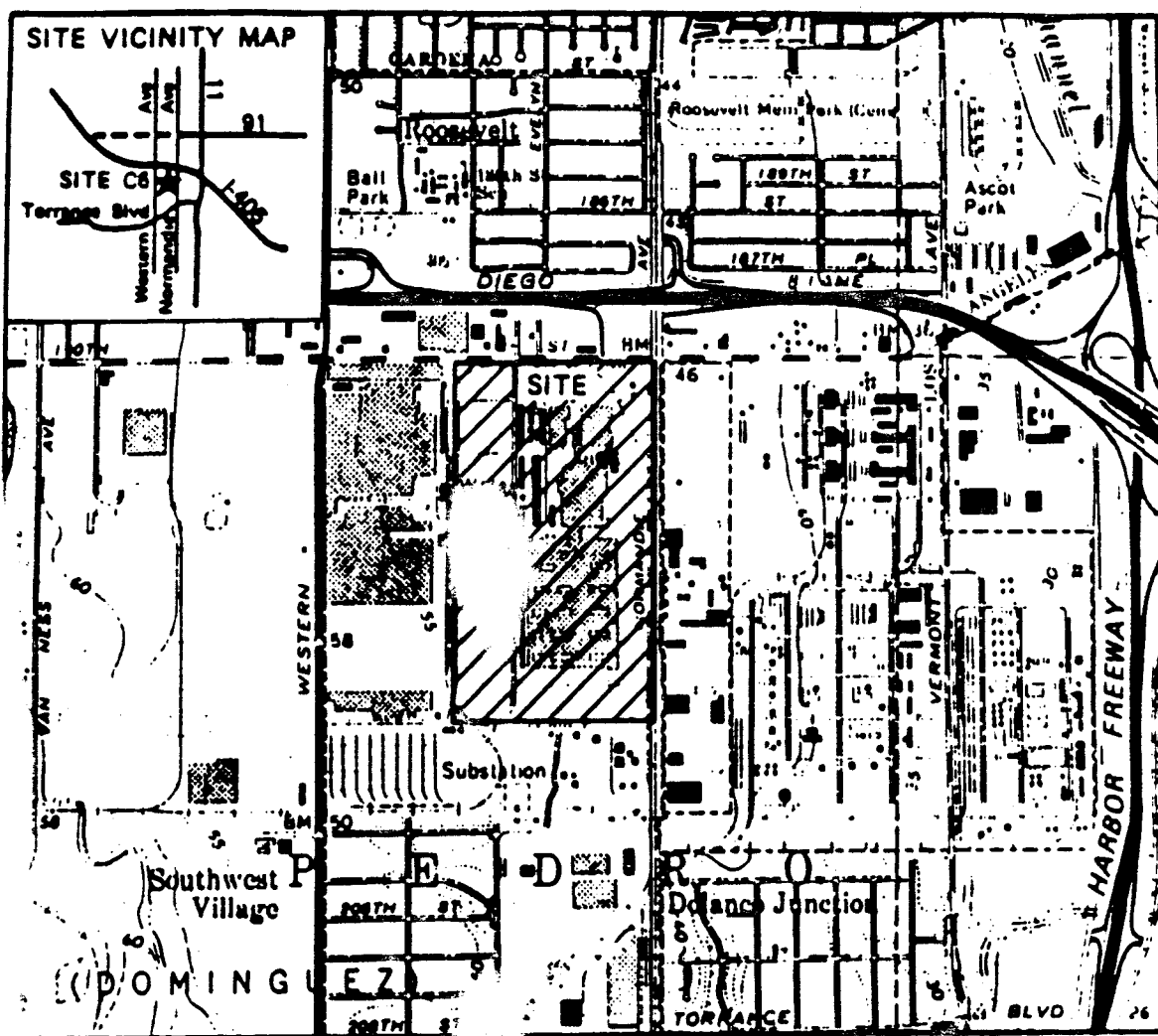
system. Such evaluations will be conducted by Douglas Aircraft after bench scale testing has been completed to aid in the selection of an appropriate system.

5.2 Discussion

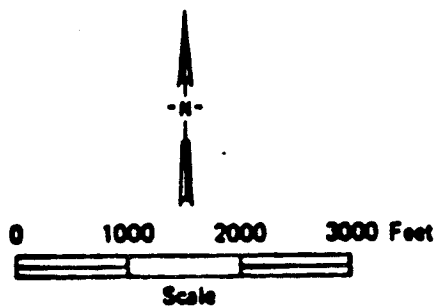
During this alternative review, vendors contacted indicated that treatability studies done on laboratory scale are completed for a fee. Generally this fee is charged to recoup analytical analysis cost incurred during the testing of the systems. Two types of systems will be evaluated by Douglas Aircraft Company for possible treatment methods for the C6 facility: air/steam stripping and oxidation. These laboratory tests will allow vendors to better conceptualize the required treatment scheme. Also, this will allow an analysis of capital and operation costs for each system and it will help to evaluate the effectiveness of the systems.

6.0 REFERENCES

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C6 FACILITY



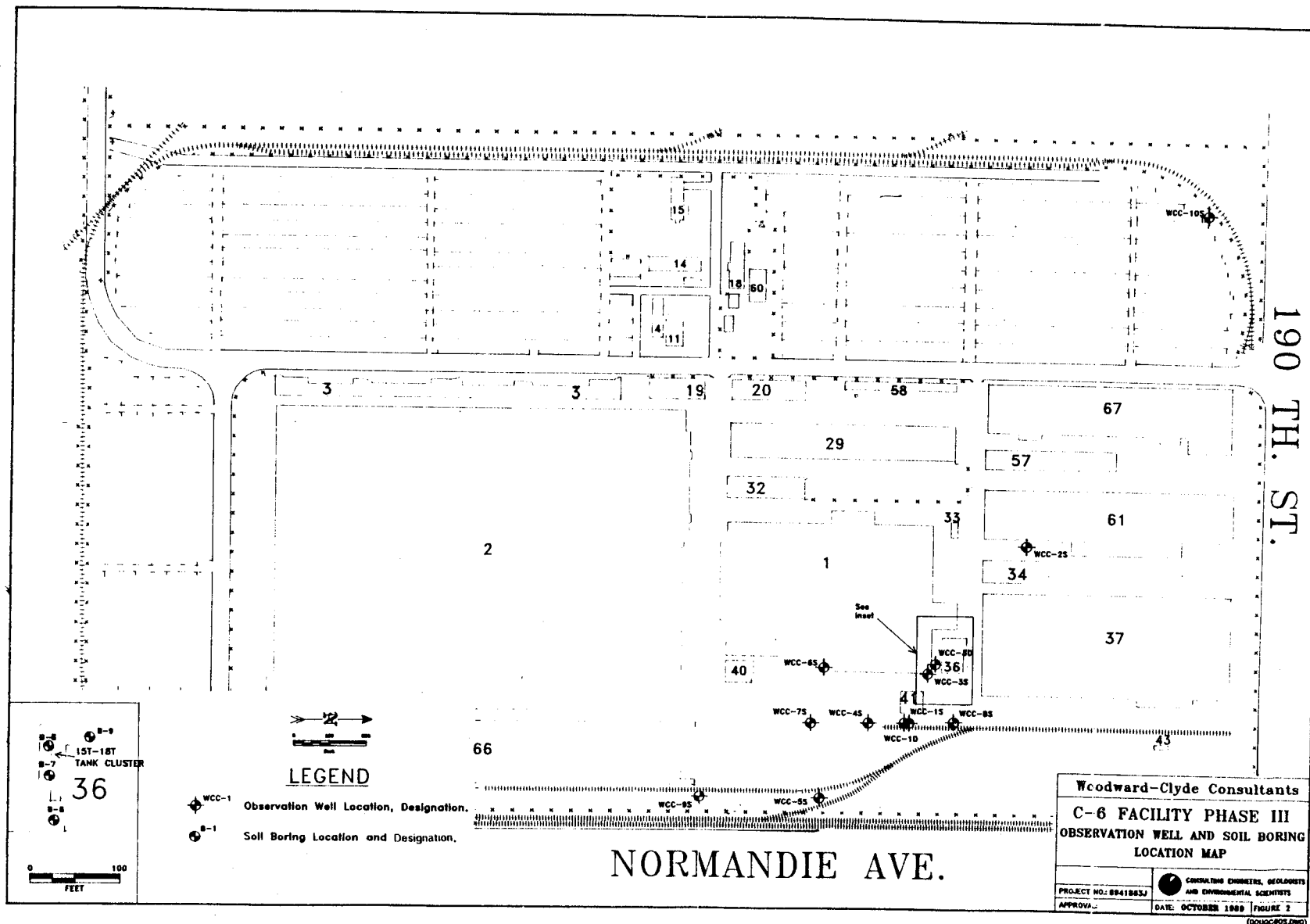
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C6 FACILITY LOCATION MAP

FIG. 1

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0092141



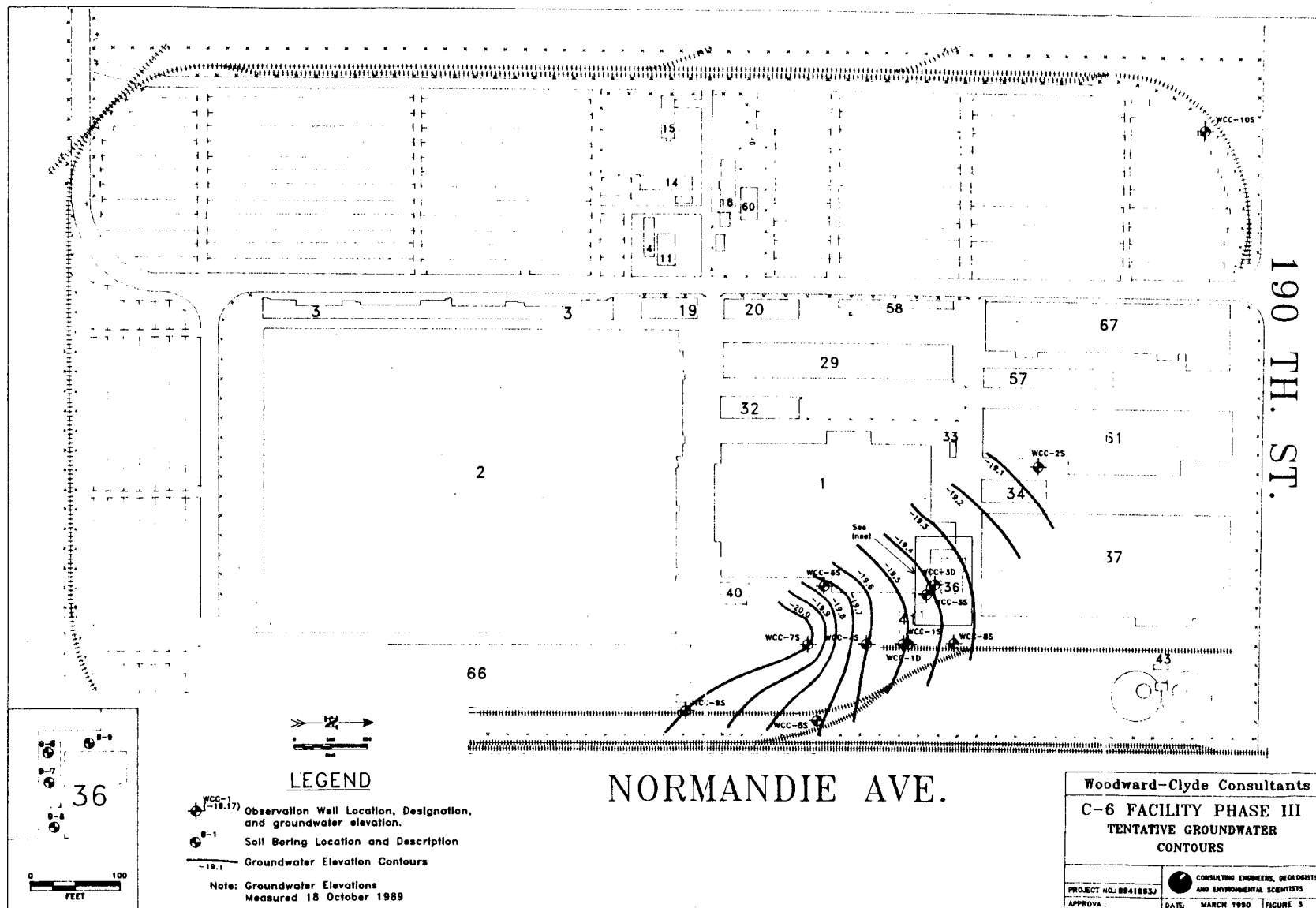


TABLE 1
SLUG TEST DATA REDUCTION
DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE CALIFORNIA

Where:

K = Hydraulic Conductivity

Rc = Radius of well casing in feet

Re = Effective Radius of influence (ft)

Yo = Initial drawdown at time t = 0 (sec)

H = Distance from base of well to SWL (ft)

A = Constant Based on L/Rw

Yt = Drawdown at time t (sec)

Dw = Depth of well (ft)

Depth to water(ft) - Measured 19 July, 30 August, and 4 October 1989.

Rw = Radius of Boring in feet

L = Length of screen of saturated thickness
if entire screen is not saturated in feet

t = Selected time/drawdown semi-log plot (sec)

D = Thickness of aquifer in feet

(Bottom of aquifer approx. 150 feet)

B = Constant based on L/Rw

Parameter	WCC-4S		WCC-5S		WCC-7S		WCC-8S	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Rc	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Rw	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Dw	90	90	90	90	90	90	90	90
DTW	69.35	69.35	69.69	69.69	68.41	68.41	70.01	70.01
L = (Dw-DTW)*	20.65	20.65	20.31	20.31	21.59	21.59	19.99	19.99
D = (150-DTW)	80.65	80.65	80.31	80.31	81.59	81.59	79.99	79.99
H = (Dw-DTW)	20.65	20.65	20.31	20.31	21.59	21.59	19.99	19.99
A	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
L/Rw	49.17	49.17	48.36	48.36	51.40	51.40	47.60	47.60
Yo	0.87	1.5	0.65	2.05	0.84	1.5	0.94	1.5
Yt	0.28	0.33	0.16	0.61	0.38	0.7	0.62	1
t	20	20	11	10	20	20	20	20
Ln Re/Rw =	2.52584	2.52584	2.50616	2.50616	2.57881	2.57881	2.48737	2.48737
K (ft/sec) =	1.00E-04	1.34E-04	2.27E-04	2.16E-04	6.85E-05	6.58E-05	3.74E-05	3.65E-05
AVG K (ft/sec)	1.17E-04		2.22E-04		6.71E-05		3.69E-05	
AVG K (CM/SEC)	3.57E-03		6.76E-03		2.05E-03		1.13E-03	
AVG K (Gal/day/ft2)	7.56E+01		1.43E+02		4.34E+01		2.39E+01	

TABLE 1 (Continued)

Parameter	WCC-9S		WCC-10S		WCC-1D		WCC-3D	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Rc	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Rw	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Dw	90	90	90	90	140	140	140	140
DTW	67.17	67.17	69.51	69.51	70.09	70.09	70.62	70.62
L = (Dw-DTW)*	22.83	22.83	20.49	20.49	20	20	20	20
D = (150-DTW)	82.83	82.83	80.49	80.49	79.91	79.91	79.38	79.38
H = (Dw-DTW)	22.83	22.83	20.49	20.49	69.91	69.91	69.38	69.38
A	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
L/Rw	54.36	54.36	48.79	48.79	47.62	47.62	47.62	47.62
Yo	0.91	1.9	0.96	1.5	2.25	2.4	1.68	1.7
Yt	0.16	0.21	0.56	0.83	0.39	0.52	1.23	1.36
t	71	77	20	20	117	117	60	60
Ln Re/Rw =	2.64567	2.64567	2.51661	2.51661	3.19028	3.19028	3.18702	3.18702
K (ft/sec) =	4.10E-05	4.79E-05	4.78E-05	5.25E-05	3.45E-05	3.01E-05	1.20E-05	8.56E-06
AVG K (ft/sec)	4.44E-05		5.02E-05		3.23E-05		1.03E-05	
AVG K (CM/SEC)	1.36E-03		1.53E-03		9.86E-04		3.13E-04	
AVG K (Gal/day/ft2)	2.87E+01		3.24E+01		2.09E+01		6.63E+00	

TABLE 2
SUMMARY OF AQUIFER HYDRAULICS TESTING

Well No.	Hydraulic Conductivity (gpd/ft ²)			Coefficient of Storativity (S) (from pump test)
	Slug Test ^a	Pump Test	Pump Test ^b Analysis Method	
1S	--	460	Cooper Jacob	0.014
2S	NT	NM	--	--
3S	NT	ND	--	--
4S	76	470	residual drawdown	--
5S	140	NM	--	--
6S	NT	970	Cooper Jacob	0.004
7S	43	970	Cooper Jacob	0.013
8S	24	560	Cooper Jacob	0.009
9S	29	NR	--	--
10S	32	NM	--	--
1D	NT	NR	--	--
3D	6.6	NM	--	--
1S, 6S, 7S, 8S	--	860	Distance drawdown (500 minutes)	0.007

a Slug test values included for reference, generally not directly comparable to pump test values.

b WCC-4S was pumping well.

NT Not tested.

NR Not responsive.

NM Not monitored.

TABLE 3

**GROUND WATER ELEVATION DATA COLLECTED 18 OCTOBER 1989
DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE, CALIFORNIA**

Well No.	Elevation ¹ Top of Well ² (ft)	Depth to Ground Water From top of Well (ft)	Elevation of Ground Water (ft)
WCC-1S	50.70	70.18	-19.48
WCC-2S	50.59	69.65	-19.06
WCC-3S	51.19	70.61	-19.42
WCC-4S	49.69	69.28	-19.59
WCC-5S	48.22	67.92	-19.70
WCC-6S	50.95	70.65	-19.70
WCC-7S	48.29	68.36	-20.07
WCC-8S	50.56	69.91	-19.35
WCC-9S	47.01	67.08	-20.07
WCC-10S	51.12	69.54	-18.42
WCC-1D	50.45	69.96	-19.51
WCC-3D	51.18	70.56	-19.38

1 Reference: City of Los Angeles Benchmark CY-3028, datum is Mean Sea Level (MSL).

2 Top of well is top of well casing on north side marked with permanent ink.

TABLE 4
RESULTS OF SOIL ANALYSES AT DAC C6 FACILITY

Boring Number	Depth of Sample (feet)	Halogenated and Aromatic Volatile Organics (EPA Method 8010/8020, concentrations in ppm)	
B-6	10	0.053 0.011 0.016 0.064 0.001 0.009	methylene chloride DCA TCE toluene ethylbenzene total xylenes
B-6	20	12 45 1,900 51 390	TCA TCE toluene ethylbenzene total xylene
B-6	30	48 21	toluene total xylenes
B-6	30	19 6	toluene total xylenes
B-6	40	59 23 320 2.9 21	TCA TCE toluene ethylbenzene total xylenes
B-6	50	0.06 0.09 0.53 0.035 0.31 0.03	1,1-dichloroethylene DCA TCA TCE toluene total xylenes
B-6	60	7.7 9.9 2.9	TCA toluene total xylenes
B-7	30	0.15 0.09 1.7 0.09	TCA TCE toluene total xylenes
B-7	35	1	total xylenes
B-7	40	10 40 1	TCA toluene total xylenes

TABLE 4 (continued)

Boring Number	Depth of Sample (feet)	Halogenated and Aromatic Volatile Organics (EPA Method 8010/8020, concentrations in ppm)	
B-7	40	12/10 25/40 <1	TCA toluene xylenes
B-7	50	57 880 4 41 1.7	1,1-dichloroethylene TCA 1,1,2-trichloroethane toluene total xylenes
B-7	60	20,000 600 59,000 140 450	methylene chloride 1,1-dichloroethylene TCA tetrachloroethylene toluene
B-8	45	0.27	toluene
B-8	50	0.04	toluene
B-8	60	0.04 0.44 1.0	DCA TCA toluene
B-8	65	0.05 25	TCA toluene
B-9	40	0.03 0.02 0.08 0.1	DCA TCA TCE toluene
B-9	50	0.02 0.11	TCE toluene
B-9	55	0.03 0.06	TCA toluene
WCC-6S	75	9.4 8.4 1.0 0.30	MEK MIBK Toluene Butyl Cellosolve

TABLE 4 (continued)

Boring Number	Depth (feet)	Halogenated and Aromatic Volatile Organics (EPA Method 8010/8020, concentrations in ppm)	
WCC-6S	80	9.2 .24 2.50 2.20 .08 0.70	MEK DCE MIBK toluene TCE butyl cellosolve
WCC-6S	85	.550 .330 .150 .007	MEK MIBK toluene TCE

Borings 8 and 9 sampled on 6/14/89, Borings 6 and 7 sampled on 6/13/89.

MEK, 2-Butanone
MIBK, 4-methyl-2-pentanone
TCA, 1,1,1-trichloroethane
TCE, trichloroethylene
DCE, 1,1-dichloroethylene

TABLE 5
GROUND WATER ANALYTICAL DATA AT DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE, CALIFORNIA
(Concentration in ug/l)

WELL I.D.	SAMPLE DATE	COMPOUND									
		1,1-DCE	1,1-DCA	1,1,1-TCA	TCE	MIBK	trans-1,2-DCE	Chloroform	Toluene	Benzene	cis-1,2-DCE
WCC-1S	03/27/87	2,800		300	4,600	--	--	--	--	85	--
	04/13/87*	3,700/2,500	--	260/120	5,500/3,600	--	--	--	--	110/160	--
	11/12/87	3,000	23	160	5,200	--	75	39	--	160	--
	07/13/89	900	<20	67	2,400	<100	<20	<20	<20	<20	<20
	08/23/89	1,500	<30	<30	2,800	<100	<30	<30	<30	<30	41
WCC-2S	11/02/87	5	--	5	14	--	--	--	6	--	--
	11/12/87	2	--	--	4	--	--	--	1	--	--
	07/13/89	<1	<1	<1	5	<5	<1	<1	<1	<1	<1
	08/23/89	<1	<1	<1	3	<5	<1	<1	<1	<1	<1
WCC-3S	11/02/87	38,000	--	110,000	10,000	54,000	--	--	80,000	--	--
	11/12/87	88,000	1,000	54,000	11,000	70,000	--	--	140,000	--	--
	07/13/89	18,000	<500	56,000	7,700	<3,000	660	<500	32,000	<500	<500
	08/23/89	56,000	<1,000	78,000	6,000	<5,000	<1,000	<1,000	56,000	<1,000	<1,000
WCC-4S	11/02/87	360	--	14	700	--	2	2	--	--	--
	11/12/87	1,200	--	35	690	--	--	--	--	--	--
	07/13/89	170	<3	11	270	<20	<3	<3	<3	<3	10
	08/23/89	360	<5	7	410	<30	<5	<5	<5	<5	15
WCC-5S	11/30/87	7	--	--	1	--	--	--	1	--	--
	01/08/88	4	--	--	10	--	--	--	--	--	--
	07/13/89*	3/3	<1/<1	<1/<1	13/12	<5/<5	<1/<1	<1/<1	<1/<1	<1/<1	6/6
	08/23/89	<1	<1	<1	12	<5	<1	<1	<1	<1	4
WCC-6S	10/6/89	210	4	130	140	<5	7	<1	<1	<1	12
WCC-7S	07/13/89	850	<10	110	1,300	<50	11	<10	<10	<10	26
	08/23/89	1,100	<30	66	1,400	<100	<30	<30	<30	<30	31
WCC-8S	07/13/89	430	<5	160	240	<30	9	<5	<5	<5	7
	08/23/89	820	<5	130	430	<30	<5	<5	<5	<5	7
WCC-9S	10/6/89	<1	<1	<1	15	<5	<1	<1	<1	<1	7
WCC-10S	07/13/89*	2/1	<1/<1	<1/<1	86/87	<5/<5	<1/<1	3/3	<1/<1	<1/<1	<1/<1
	08/23/89	4	<1	<1	81	<5	<1	4	<1	<1	<1
WCC-1D	07/25/89	<1	<1	<1	2	<5	<1	<1	1	<1	1
	08/23/89	<1	<1	1	2	<5	<1	<1	<1	<1	<1
WCC-3D	07/25/89	<1	<1	49	4	<5	<1	<1	3	<1	11
	08/23/89	<10	<10	32	<10	<50	<10	<10	<10	<10	<10

* Duplicate sample also analyzed
-- Not Detected (Detection limit not specified)

APPENDIX A
FIELD PROCEDURES
AND
AQUIFER TESTING DATA ANALYSIS

(2L-ABC/C6GW3-AA)

APPENDIX A
FIELD PROCEDURES AND
AQUIFER TESTING DATA ANALYSIS

A.1 GENERAL INFORMATION

Drilling was performed by two companies: A&R Drilling, Inc. of Carson; and Beylik Drilling, Inc. of La Habra California. Drilling began on 5 June 1989 and was completed on 30 June 1989. Soil sample borings and shallow observation well borings were drilled using a CME-75 drill rig equipped with 6-1/2 inch O.D. hollow stem augers for soil sampling and 11-inch O.D. hollow stem augers for well installation. The deep observation well borings were completed by mud rotary drilling using an Ingersoll-Rand drill rig equipped with a 10-inch tri-cone drill bit.

A.1.1 Shallow Observation Well Installation

Observation Wells WCC-7S, 8S, and 10S were constructed of threaded 4-inch diameter, Schedule 40 PVC casing and screen and set to a depth of approximately 90 feet. The observation wells were installed by first drilling a sampling borehole with the 6-1/2-inch outside diameter (O.D.) hollow stem augers. In general, soil samples were collected at near-surface, 5 feet and then at approximately 5 foot intervals. Next, these augers were removed from the boring and the 11-inch O.D. hollow stem augers with a wooden plug placed in the bottom were used to ream out the boring to its total depth of 90 feet. Upon reaching total depth the inside of the augers were quickly filled with tap water and the wooden plug was knocked out of the bottom auger. The water was used to form hydrostatic pressure in the augers to help hold out the surging sands which would otherwise fill up the inside of the bottom augers and prevent a proper well installation. After knocking out the wooden plug, the 4-inch diameter wells were installed by

inserting the casing into the hollow stem auger and allowing the well casing to rest on the bottom of the boring. Filter pack material (Lone Star No. 0/30) was poured from the surface into the annulus between the casing and hollow stem auger. As filter pack material was introduced into the borehole, the hollow stem augers were slowly withdrawn from the hole to allow the filter pack to fall in place between the well casing and native soil. The same procedure was followed in placing the bentonite plug and the volclay grout backfilling.

A.1.2 Deep Observation Well Installation

Observation Wells WCC-1D and WCC-3D were also constructed of threaded 4-inch diameter, Schedule 40 PVC casing and screen and set to a depth of approximately 140 feet. The wells were installed by first completing a sampling borehole using a wire line coring system which was used to attempt continuous coring from 120 to 140 feet. This sampling system worked satisfactorily on WCC-3D, but had little success in WCC-1D. After completing the sampling borehole, the geologic formation was electrically logged (E-logged) by Geo-Hydro-Data, Inc. of Tehachapi, California. Next, the boring was reamed out to the total depth with a 10-inch diameter drill bit.

Once the boring was completed for the casing installation, the drilling mud was thinned to help break down the mud cake formed on the sidewalls of the boring. In both WCC-1D and WCC-3D the mud was thinned too much on the first attempt, and the boring sidewalls caved in and had to be redrilled. The well casing was placed down the 10-inch boring with centralizers installed at five locations along its length to keep it centered in the boring and not laying against the sidewalls. Filter pack sand was placed outside the screened interval of the casing using 1-1/2 inch diameter tremie pipe

and washing it down with tap water. A bentonite plug was set in the boring on top of the filter pack by pouring 1/4-inch bentonite pellets directly into the boring.

After allowing the bentonite pellets to settle into place the remainder of the annulus was backfilled by tremie pipe with volclay grout up to 8 feet below the surface. The top 8 feet of the annulus was backfilled with concrete.

A.1.3 Well Construction

The observation wells were constructed of 4-inch O.D. Schedule 40 PVC flush-threaded blank pipe, and screened with 0.010-inch slotted PVC screen. Adhesives were not used. The shallow wells were installed with 70 feet of blank casing and 30 feet of screen. The deep wells were installed with 120 feet of blank casing and 20 feet of screen. The well screen was filter packed by pouring or tremieing the filter material into the borehole from the surface. A filter pack material of Lone Star No. 0/30 sand was selected based on a field sieve analysis. Filter pack analysis and design procedures are discussed in Section C.4. The filter pack was placed from the well bottom to about 5 feet above the top of the well screen.

An approximately 5-foot thick bentonite pellet plug was placed on top of the filter pack, to minimize movement of fluids through the annular space. In addition, volclay bentonite grout was placed in the annulus from the top of the bentonite plug to approximately 8 feet below ground surface. A concrete plug was placed from the top of the volclay to the surface, to minimize seepage of surface fluids into the well and to provide strength to the backfill. The top of the well casings were completed 3 to 6 inches below grade with a waterproof locking well cap and protected with a moisture resistant steel traffic-rated

Christy box. Figure A.0 is a schematic of the general observation well design. Appendix D presents the boring logs and graphic well construction details.

A.1.4 Soil Borings

Four soil borings, B-6 through B-9, to collect soil samples for chemical analysis and lithologic logging, were completed in the vicinity of the underground tank cluster, 15T through 18T. Each boring was completed to a depth of 65 feet.

Soil sampling as described in Section A.2 was completed in each boring just below the surface, and at 5-foot intervals to the total depth of each boring.

A.1.5 Soil Boring Backfill

Soil borings B-6 through B-9 were backfilled with silica sand and bentonite powder, at a ratio of 4 to 1. The top 1 to 2 feet of the borings were backfilled with asphalt.

A.2 SOIL SAMPLING

Soil samples were collected at 5-foot intervals in the soil borings and the shallow well borings to make observations regarding subsurface stratigraphic conditions and the presence of contamination, to perform field headspace tests, and to conduct laboratory analyses. Soil samples were collected using a modified California sampler that contained four brass tubes. The brass tubes were filled by driving the sampler 18 inches into undisturbed soil with the drop hammer. The number of blows required to drive the sampler 12 inches was recorded on the boring log and used to evaluate the density or consistency of the soil.

Additional soil sampling was completed for logging purposes only in the deep well borings beginning at 120 foot depth

and continuing to 140 feet. This sampling was performed using a wire line coring system which had a 2-inch diameter by 5-foot long split barrel sampler.

A.2.1 OVA Headspace Measurements

In general, one brass tube from each sample was extruded and placed into a sealable plastic bag. The bag was sealed and after approximately 5 to 10 minutes, an organic vapor analyzer (OVA) probe was inserted into the bag, and the vapor concentration in the headspace was measured and recorded on the boring log.

A.2.2 Soil Sample Preparation

One to two tubes from the soil sampler were prepared for laboratory analysis. The ends of the tubes were covered with aluminum foil, plastic end caps, and sealed with electrical tape. Soil samples were labeled with the following information:

- o Project number
- o Project name
- o Boring number
- o Sample number
- o Soil depth
- o Date
- o Sampler's initials

The soil samples were then sealed in Ziploc plastic bags and placed on ice in an ice chest. All of the soil samples were delivered to West Coast Analytical Service, Inc. in Santa Fe Springs, California for analysis. Chain-of-custody procedures, including the use of sample identification

labels and chain-of-custody forms were used for tracking the collection and shipment of soil samples. Copies of the chain-of-custody forms are presented in Appendix C.

A.2.3 Drilling Residuals

Drill cuttings from the soil borings and the shallow well borings were placed in Department of Transportation (DOT) Class 17H 55-gallon drums, and the contents of the drums were labeled using a permanent ink marker and a spray-painted inventory number corresponding to an inventory list compiled by the field engineer. The drums were sealed and stored inside the facility hazardous waste storage area. Drilling mud and soil cuttings produced during installation of the two deep observation wells were pumped into separate roll-off bins next to the wells. Douglas Aircraft was advised of the locations and contents of the drums, and the need for proper management of the drill cuttings.

A.3 FIELD OBSERVATIONS

Observations by Woodward-Clyde Consultants' personnel during the drilling, sampling, and well installation operations were recorded on boring logs, as presented in Appendix B. These observations related to visual soil classifications, geologic and stratigraphic sample descriptions, observation well construction details, sampling efforts, OVA measurements, and other pertinent information.

A.4 FILTER PACK ANALYSIS

The selection of the proper filter pack material and well screen slot size is essential in collecting a sediment-free or low sediment content water sample. In all observation wells, soil samples were collected for sieve analysis. Filter pack design calculations were made based on the grain size distribution of these finest grained soil samples

collected within the designed screen interval and below the ground water table. For observation Wells WCC-1D, 3D, 7S, 8S, and 10S the depths of the samples analyzed were 123, 122, 75, 75, and 80 feet, respectively.

Soil sieve analyses for selection of well screen slot and filter pack size were conducted in the field. Each soil sample was heated with a portable propane stove to evaporate water from the soil. When the sample was dry, it was weighed on a scale to the nearest gram. The soil sample was then poured into the top of an eight sieve stack and shaken for approximately 5 minutes. The sieve sizes used in the analysis are shown in Figure A-1. The soil retained in each sieve was weighed and the cumulative percent retained was calculated for each sieve. The gradation analyses for the wells are illustrated in Figures A-1 through A-5.

A well design using a Lonestar No. 30 sand filter pack and a screen slot width of 0.01 inches (10 slot) was used for the five wells based on the gradation analyses. An ideal gradation of filter pack and screen slot width are plotted on Figures A-1 through A-5 along with the actual material sizes used. These ideal sizes were calculated using the well design formulas presented in "Ground Water and Wells" by Driscoll, 1986." A commercially blended filter pack material was then selected that best matched the calculated filter pack curve, since custom made filter pack materials were not readily available. The grain size analysis curves for Wells -1D, -3D, -7S, -8S, and -10S were similar, and the soils were classified as silty sands to sandy silts. This lithologic classification also correlated with the field descriptions of WCC--1D, -3D, -1S, -2S, -3S, and -4S.

A.5 WELL DEVELOPMENT

Observation Wells WCC-7S, -8S, -10S, -1D, and -3D were developed by Howard Pumps, Inc. of Barstow, California. Development occurred on 5 through 7 July 1989. During this development WCC-1D was damaged by breaking the bottom plug out of the well while bailing. Due to the formation conditions, sand surged up about 8 feet into the casing. This damage was repaired on 20 July 1989 by filling the well casing with drilling mud and then bailing the sand out of the bottom. Then a 2-foot plug of bentonite clay was set in the bottom of the well by pouring dehydrated bentonite pellets down the well and allowing them to hydrate. Once the pellets had hydrated, and formed a new bottom plug, the well was redeveloped.

All of the wells were developed, first by bailing and surging, to remove the maximum amount of sediment possible. Next the wells were pumped by submersible pump to remove a large volume of water and assure the ground water around the well was formation water which had not been affected by the well installation. The two deep observation wells, WCC-1D and -3D, required a greater effort in their development because they were installed using mud rotary drilling. In Table A-1 the development times, and the ground water volumes removed during development are presented. The water removed from each well was observed to become clearer during development and was completely clear upon completion of development. Water removed from the wells during development was stored in one large, steel, temporary "Baker" storage tank on site near Building No. 41, prior to treatment and discharge.

A.6 GROUND WATER SAMPLING

Two rounds of ground water sampling were completed from all ten of the observation wells. On 11, 12, 24, and 25 July 1989 the first round of sampling occurred (the two deep observation wells were sampled on the later two dates due to the damage of WCC-1D), and on 21 through 23 August 1989 the second round of sampling was completed.

Prior to beginning sampling procedures the static ground water level was measured in each well to the nearest one hundredth of a foot using an electronic well sounder. Then each well was purged, to remove possible stagnant water, by evacuating a minimum of three casing volumes of ground water. This was accomplished by bailing the well with a 3-1/2-inch-diameter PVC bailer attached to new polypropylene rope. The exception to this was the purging of WCA-1D and -3D on the first round of sampling only. These wells were purged by setting a submersible pump in the well and pumping a large volume of water for a final effort in development.

Throughout purging, and just prior to sampling the wells, pH, electrical conductivity or total dissolved solids, and temperature were measured and recorded for the evacuated ground water (Table A-2). These measurements were made to confirm that the wells were purged sufficiently. Sampling was done with a 1-1/2-inch-diameter Teflon bailer suspended from a monofilament line. Water samples were collected from each well in two 40 ml VOA vials.

In addition to water samples, bailer rinse samples were also collected in two 40 ml VOA vials for each well prior to collecting the water samples. The rinse samples were collected for possible analysis to confirm the sampling equipment was satisfactorily decontaminated.

The water samples, rinse samples, and two 40 ml VOA trip blanks for each sampling round, were packed on ice in a portable chest immediately after collection. Samples were delivered on the day following collection to West Coast Analytical Services. Chain-of-custody procedures, including the use of sample identification labels and chain-of-custody form, were used for tracking the collection and delivery of the samples. The chain-of-custody form is presented in Appendix C.

A.7 EQUIPMENT DECONTAMINATION PROCEDURES

Soil and ground water sampling equipment was decontaminated between sampling events using the following procedure:

1. Brush-assisted water rinse to remove soil and mud (soil sampling only)
2. Water wash with Liquinox
3. Deionized water rinse to remove Liquinox
4. Second rinse with deionized water
5. Dry with paper towels (soil sampling only).

Prior to use at the site, the brass tubes used in the modified California sampler were cleaned in WCC's laboratory by washing sequentially in dilute sulfuric acid, Liquinox and water, and deionized water. The tubes were then air dried, and stored in sealable plastic bags prior to use at the site. New end caps were carried to the site in sealable plastic bags.

Drill augers or pipes, pumps, bailers, surge blocks, and cables were all steam cleaned prior to working on each boring or well. Steam cleaning was performed by the drilling companies on the facilities steam cleaning pad.

A.8 SLUG TESTING

Slug tests were conducted on observation Wells WCC-4S, -5S, -7S, -8S, -9S, -10S, -1D, and -3D on 19 July, 30 August, and 4 October 1989. Slug testing is a relatively quick and cost-effective method of measuring actual field hydraulic conductivity (K) values. Slug test derived hydraulic conductivity (K) values are not as accurate as aquifer pump test derived values, however, they are useful in preliminary calculations and in identifying large anomalies in hydraulic conductivity (K) values.

Slug tests only measure the average horizontal hydraulic conductivity (K) in the immediate vicinity of the well. In comparison a pump test stresses the aquifer at a greater radial distance, and as a result, a more representative hydraulic conductivity value (K) is obtained.

The slug tests were performed using the following equipment:

- o DL-120-MCP Envirolabs data logger with a 25 psi pressure transducer
- o One 3.25-inch diameter x 39-inch-long sand weight mandrel with a 1.4 gallon volume
- o Steel tripod and polyethylene rope

The weighted mandrel was used with the tripod and rope to simulate a slug of water being inserted and withdrawn from the well. The pressure transducer and data logger recorded the subsequent drawdown and recovery water level measurements of the well. One cycle of drawdown and recovery was performed on each observation well.

Data from the slug tests were evaluated using the Bouwer-Rice method (June 1976) for calculating hydraulic conductivity (K). Bouwer and Rice developed a procedure

that considers the effects from partially penetrating wells, the radius of the gravel pack, and the effective radius of influence of the test.

The Bouwer and Rice method entails solving the following equation:

$$K = \frac{r_c^2 \ln(R_e/R_w)}{2Lt} \ln(Y_o/Y_t)$$

Where:

K = hydraulic conductivity

r_c = radius of well casing

R_e = effective radius of influence

r_w = radius of the well boring

L = length of screened interval or saturated thickness if entire screen is not saturated

t = arbitrarily selected time from drawdown/time semi-log plot

Y_o = initial drawdown at time $t = 0$, from drawdown/ time semi-log plot

Y_t = drawdown (distance between water level in well and static water level) at selected time (t) from drawdown/time semi-log plot

The term R_e/r_w , which is a function of the radius over which the drawdown in the well is dissipated, was solved using the following equation:

$$\ln(R_e/r_w) = \left[\frac{1.1}{\ln(H/r_w)} + \frac{A + B \ln[(D-H)/r_w]}{L/r_w} \right]^{-1}$$

Where:

- H = distance from base of well to Static Water Level (SWL)
- L = length of screen (or saturated thickness if entire screen is not saturated)
- D = thickness of aquifer
- A = constant based on value of L/r_w
(see Figure A-22)
- B = constant based on value of L/r_w
(see Figure A-22)

The test data were plotted on a semi-log diagram of drawdown (Y_t) versus time (t), drawdown being logarithmic (see Figures A-6 through A-21). The data should generate a straight line, although a flat "tail" is frequently observed. A drawdown (Y_t) is recorded for a selected time (t) within the straight line segment of the plot. Y_t and t are used in solving the equation for K .

The Bouwer and Rice method makes the following assumptions:

1. The aquifer is of constant thickness.
2. The soil is homogeneous and isotropic.
3. Flow is horizontal in the aquifer.

These assumptions are judged to be generally reasonable, recognizing that variations in aquifer thickness and anisotropic conditions will have an influence on calculated results.

A.9 PUMP TEST

The pumping well, WCC-4S, was selected because it is centrally located to the surrounding observation wells. In addition information collected during slug testing indicated the well would have a relatively high yield. Wells WCC-1S, -4S, -6S, -7S, -8S, -9S, and -1D served as observation wells.

Details of the well design for the existing ten shallow observation wells and the two deep observation wells are summarized in Table A-3. Depth of groundwater and distance to the pumping well is also included. Figure 2 shows the locations of the wells.

A 1-1/2 horsepower submersible pump was used to pump water from WCC-4S. The pump was switched on at 12:00 p.m. on 20 December 1989 and allowed to pump at 13.3 gpm for 16 hours and 30 minutes. At this rate the water level was nearly stable at a drawdown of approximately 6 feet.

The evacuated groundwater was stored in two 21,000-gallon transportable steel storage tanks. Storage requirements were estimated based on well development activities which indicated a maximum pumping rate of 4 to 5 gallons per minute. Assuming a pumping rate of up to 10 gallons per minute, Woodward-Clyde initially ordered one storage tank and figured if and when a second storage tank was required, it would be more than 24 hours after the pumping began. Because the pumping rate was greater than 10 gpm the second storage tank would have been needed before the tank rental company could respond to our request, if the 13.3 gpm pumping rate was sustained. Therefore, the flow rate was reduced to 8.5 gpm for 4-1/2 hours. After the second tank was delivered to the site, the flow rate of 13.3 was resumed and maintained for the remainder of 30 total hours of "pumping". The overall time weighted pumping rate was

approximately 12.6 gal/min. The pump was switched off at 6:00 p.m. on 21 December 1989. Measurements in the pumping well and all the monitoring wells continued until WCC-4S had recovered 99 percent of its maximum drawdown, two hours after the pump was shut off.

Water was pumped to the surface and approximately 400 feet horizontally to the storage tanks. The volume of water pumped out of WCC-4S was measured by an in-line totalizer. A total of approximately 28,000 gallons of groundwater was evacuated.

Five of the monitoring wells WCC-4S, -1S, -7S, -8S, and -1D had pressure transducers installed and connected to one of three Terra 8 data loggers to automatically measure and record the depth to groundwater. In addition, Woodward-Clyde measured the depth to groundwater on regular intervals in all of the observation wells except WCC-1S, -4S, and -1D. This task was performed using a Soloni electric well sounder. In addition barometric pressure readings were collected at regular intervals throughout the pump test using a Swift, Model 477 barometer.

The data from each well showing a discernable reaction were analyzed using one or more of the following techniques: Recovery (Residual Drawdown) plot, Cooper-Jacob Time-Drawdown plot, and/or Distance/Drawdown plot. A summary of the results is previously presented in Table 2. Slug test values obtained earlier are included for reference.

The nearly instantaneous initial drawdown and the subsequent constant drawdown with time, precluded any valid analyses of the pumping stage drawdown in the pumping well WCC-4S.

Nevertheless the recovery data for the pumping well which did appear valid was analyzed using a residual drawdown plotting technique.

This technique utilizes a semi-log plot of the residual drawdown (in feet) vs. the ratio of t/t' (see Figure A-23) where:

t = time since pumping started

t' = time since pumping stopped

The differential change in water level (Δs) is thus obtained from the plot and used in the equation:

$$K = \frac{264Q}{\Delta s \cdot b} \quad (1)$$

where:

K = Hydraulic conductivity in gpd/ft²

Q = Pumping rate, in gpm

Δs = Differential change in water level during one log cycle of time, in feet

b = The aquifer thickness (20.65 feet at WCC-4S)

Data for the observation wells WCC-1S, -6S, -7S, and -8S were analyzed using the Cooper-Jacob Time-Drawdown technique as shown on Figures A-24 to A-27. A calculation of μ (from the well function, Driscoll 1986) showed the technique would be appropriate in general. A Distance/Drawdown plot shows the change in drawdown as a function of distance from the pumping well. The equations used and the calculations are shown with the plot. Analytical methods used are discussed

in the literature (Driscoll, 1986; Walton, 1987). The fundamental equation for hydraulic conductivity is identical to Equation (1) above. Other equations include:

$$T = Kb \quad (2)$$

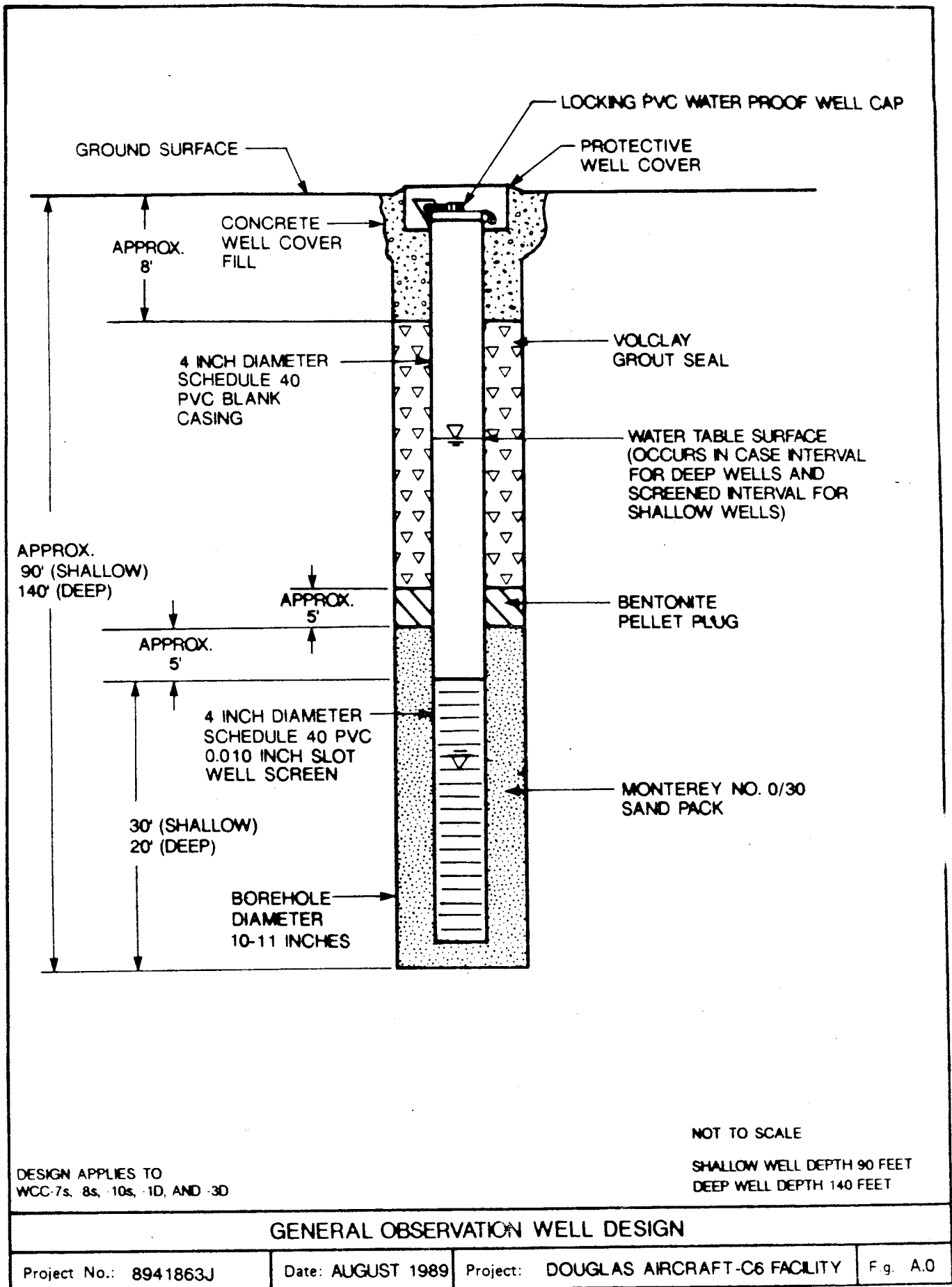
and

$$S = \frac{0.3Tt_o}{r^2} \quad (3)$$

where:

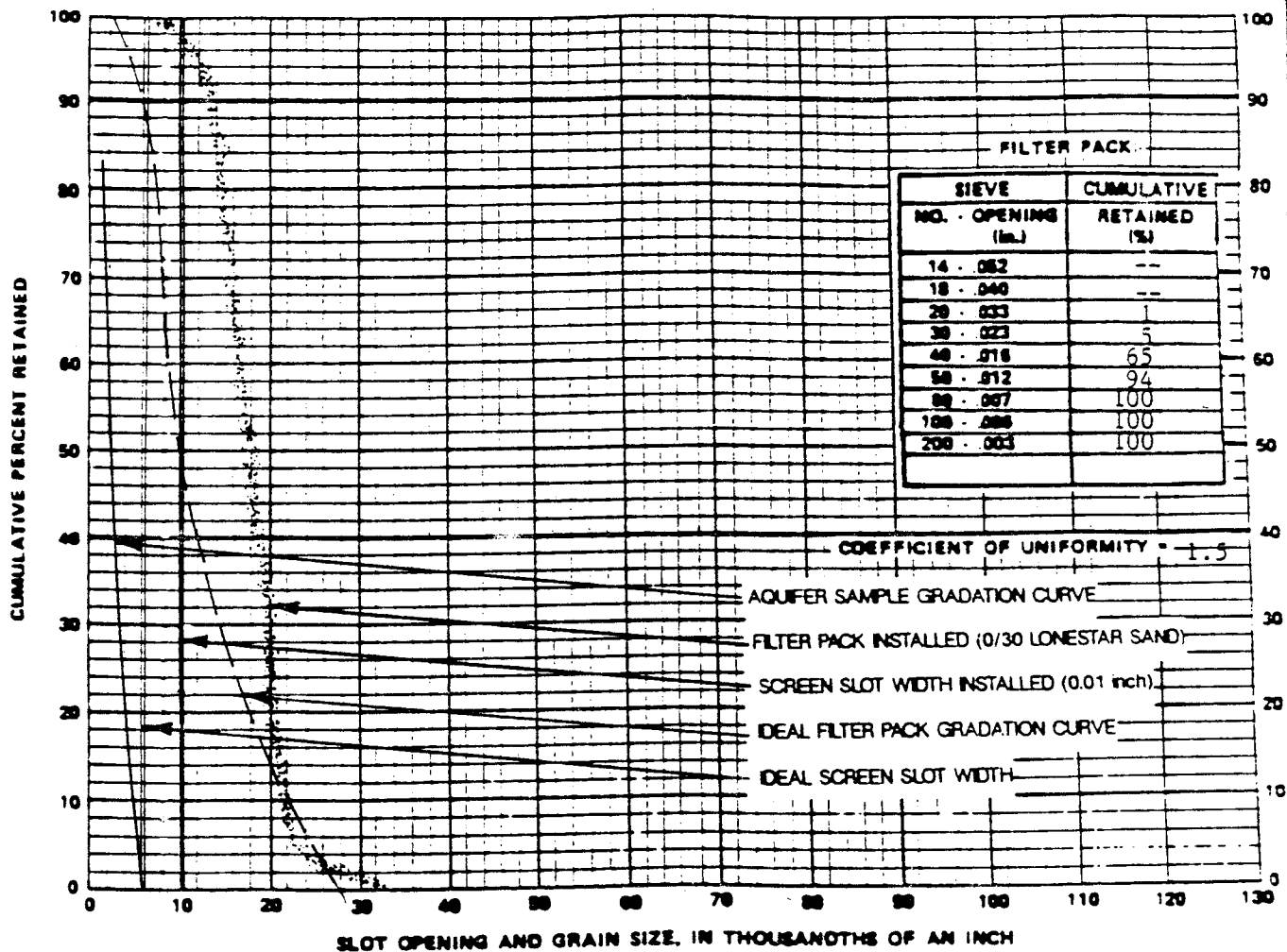
- T = Coefficient of transmissivity, in gpd/ft
- K = Hydraulic conductivity in gpd/ft² (Equation [1])
- b = Saturated thickness of the aquifer tested in feet
- s = Storage coefficient (dimensionless)
- t_o = Time, in days, of the intercept of the extrapolated drawdown curve at zero drawdown
- r = Distance, in feet, from pumped well to the observation well where drawdown measurements were made

These plots allowed the calculation of both hydraulic conductivity, and storage coefficient according to Equations (1) and (3). The method of plotting and the calculation are shown on Figure A-28.



Well Name: WCC-7s Date: 8 June 1989
 Well Location: 160 ft. South of WCC-4s
 Sample Depth: 75 ft. Performed By: P. GLAESMAN/H. REYES

Comments: _____



SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT	
		RETAINED (%)	PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .008	--	--	
80 - .007	--	--	
100 - .006	5	2.0	
200 - .003	124	46.0	
Bottom Pan	270	100.0	

Notes: WET WT. of sample: 350 gm
DRY WT. of sample: 270 gm
 Recommended Slot Opening: _____

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 Project No. 8941863J

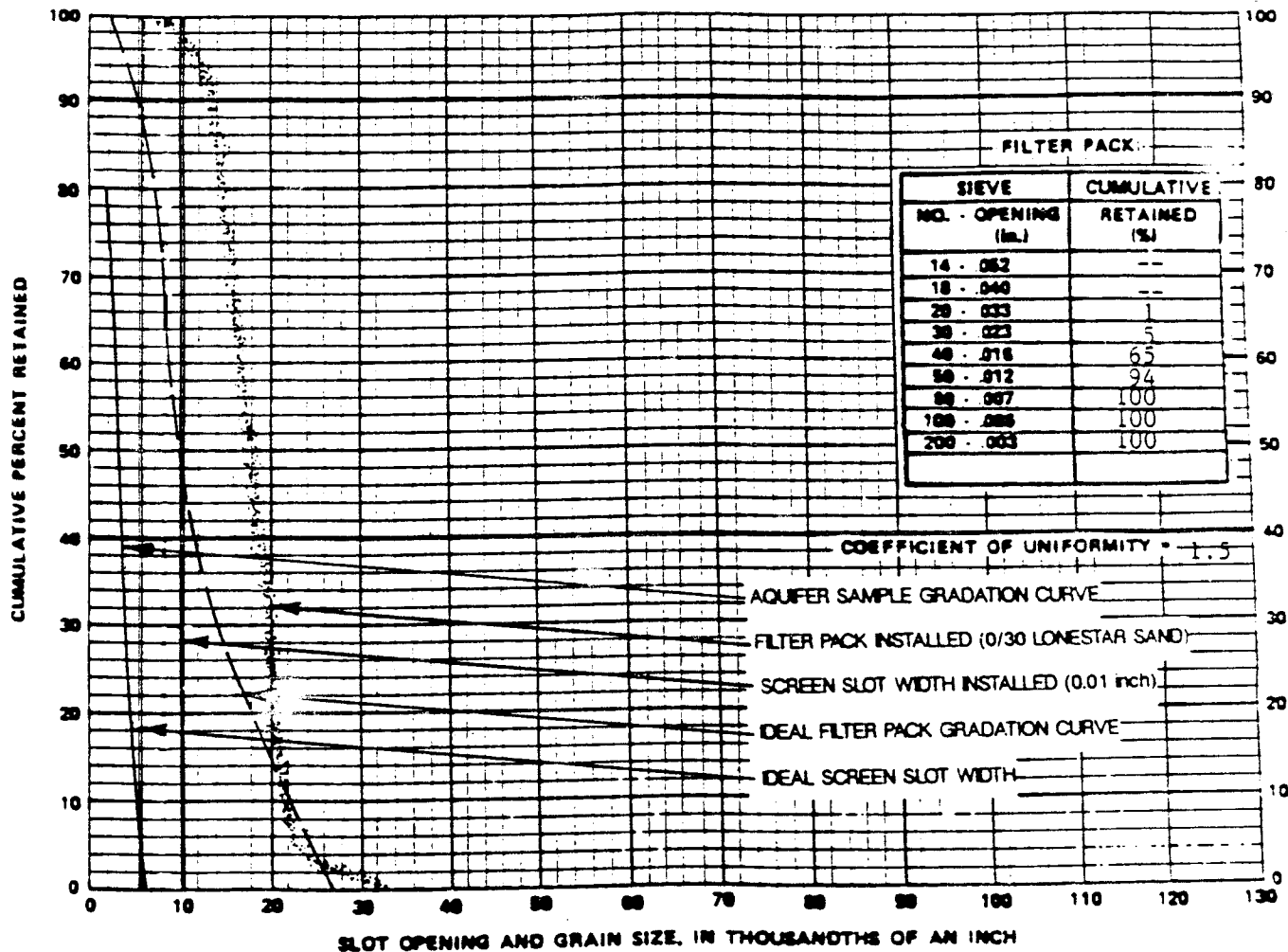
GRAIN SIZE ANALYSIS

WCC-7S

Fig. A.1

Well Name: WCC-8s Date: 12 June 1989
 Well Location: N125 ft. North of WCC-1s
 Sample Depth: 75 ft. Performed By: P. GLAESMAN/H. REYES

Comments: _____



SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT	
		RETAINED (%)	PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .009	--	--	
80 - .007	--	--	
100 - .006	3	1.0	
200 - .003	123	52.0	
Bottom Pan	235	100.0	

Notes: WET WT. of sample: 300 gm
 DRY WT. of sample: 235 gm

Recommended Slot Opening: _____

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 Project No. 8941863J

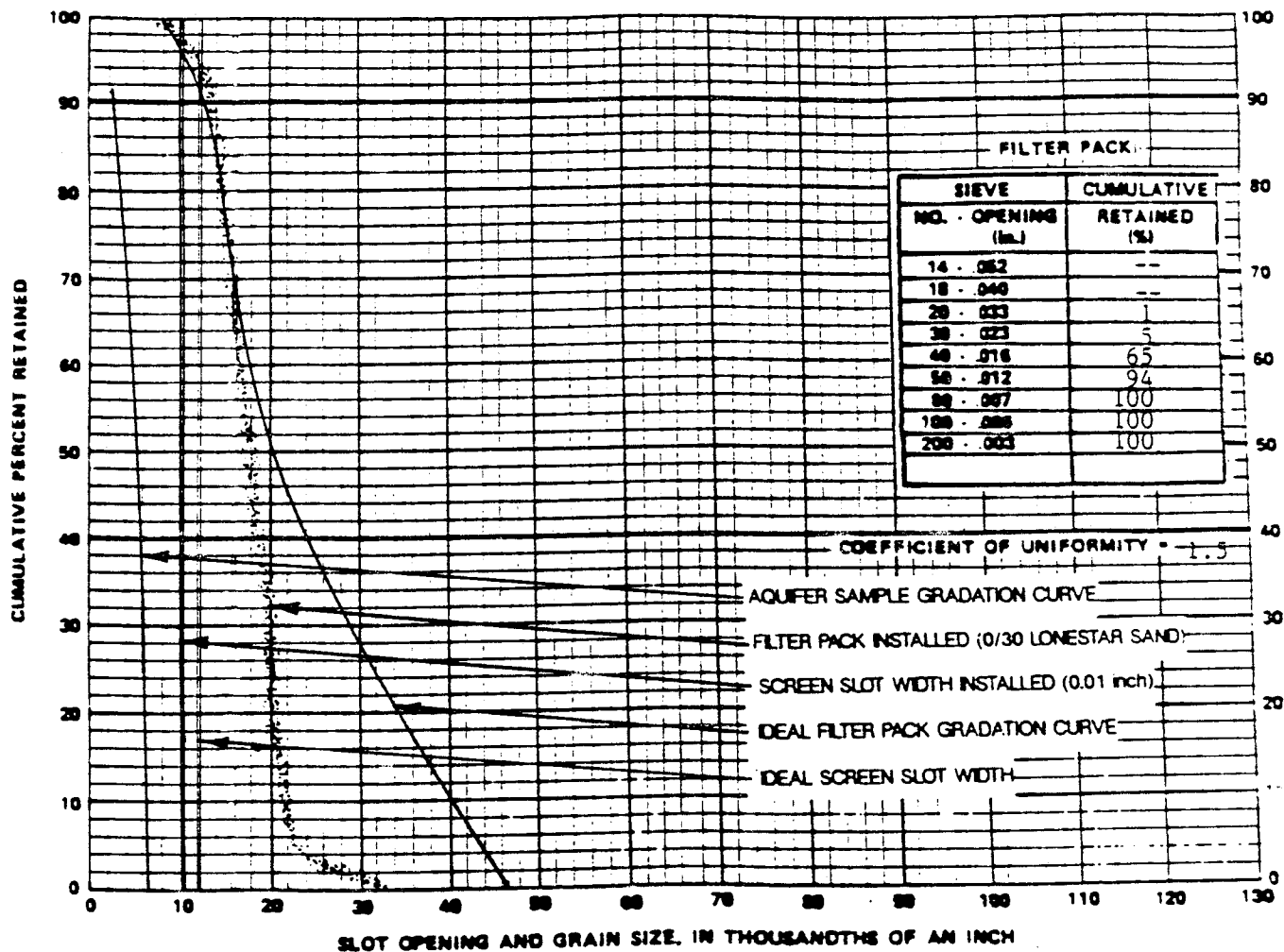
GRAIN SIZE ANALYSIS

WCC-8S

Fig. A.2

Well Name: WCC-10SDate: 6 June 1989Well Location: Northwest corner of propertySample Depth: 80 ft.Performed By: P. GLAESMAN/H. REYES

Comments: _____



SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (grams)	CUMULATIVE PERCENT RETAINED (%)	PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .0085	--	--	
80 - .007	--	--	
100 - .006	157	35.0	
200 - .003	395	88.0	
Bottom Pan	450	100.0	

Notes: WET WT. of sample: 528 gmDRY WT. of sample: 450 gm

Recommended Slot Opening: _____

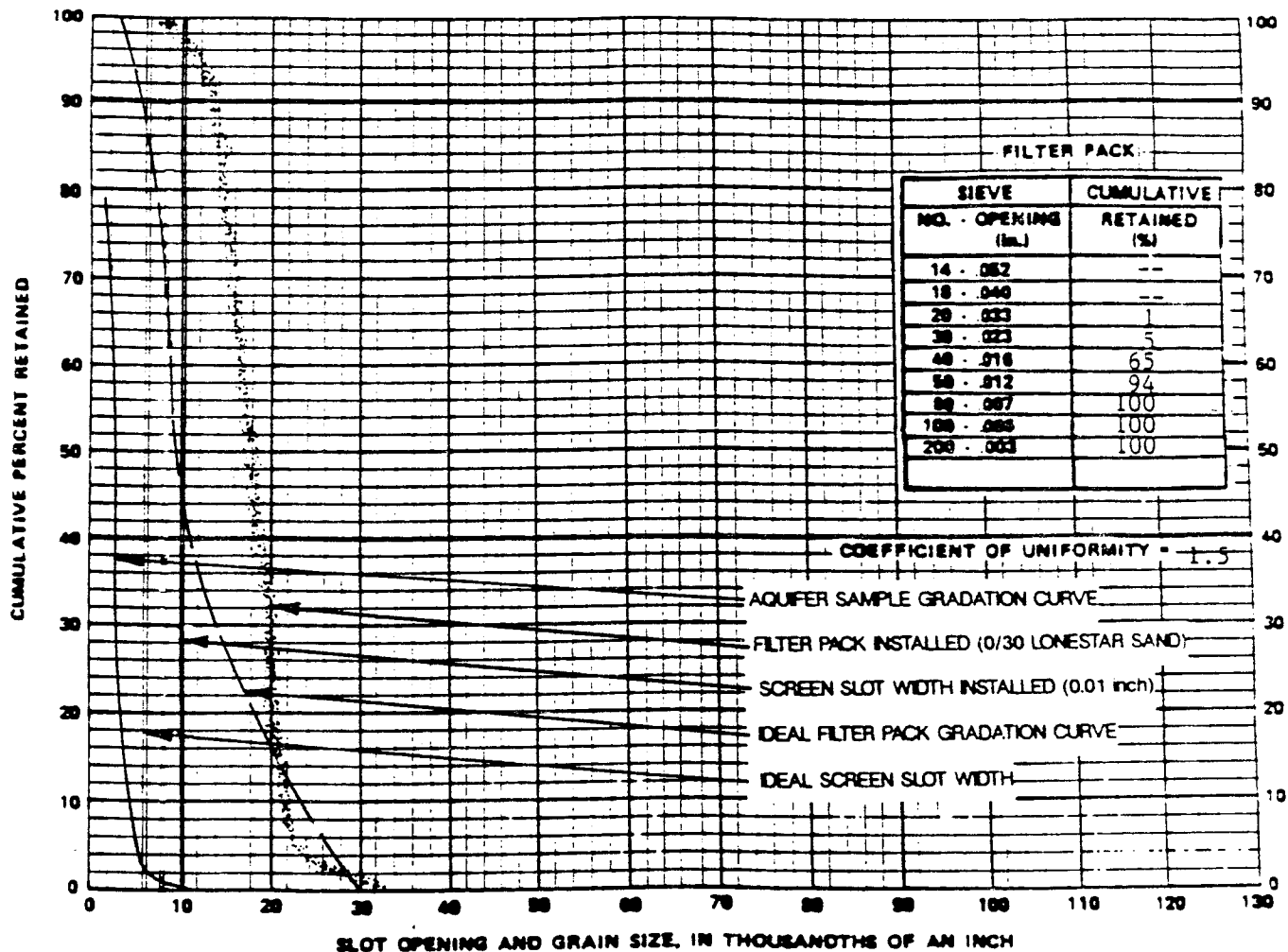
Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J**GRAIN SIZE ANALYSIS****WCC-10S**Fig. A.3

Well Name: WCC-1D Date: 6-29-89

Well Location: 10 feet south of WCC-1S

Sample Depth: 123 feet Performed By: P. GLAESMAN/H. REYES

Comments: _____



SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (grams)	CUMULATIVE PERCENT	
		RETAINED (%)	PASSING (%)
18 - 040	--	--	
20 - 033	--	--	
30 - 023	--	--	
40 - 016	--	--	
50 - 012	2	0.8	
60 - 008	2	0.8	
80 - 007	2	0.8	
100 - 006	8	3.1	
200 - 003	100	39.4	
Bottom Pan	254	100.0	

Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 254 gm

Recommended Slot Opening: _____

Project DOUGLAS AIRCRAFT CO. - TORRANCE
 Project No. 8941863J

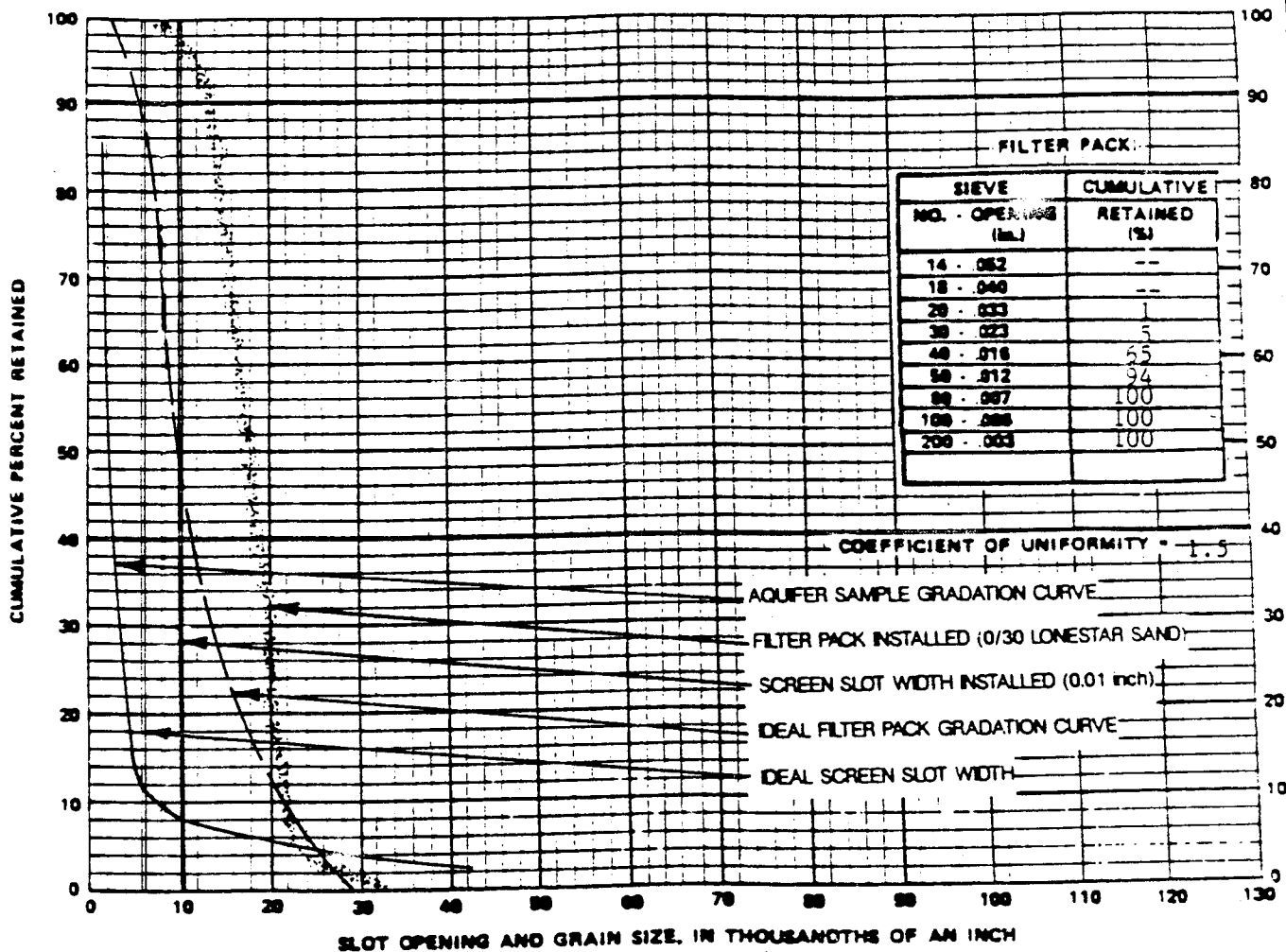
GRAIN SIZE ANALYSIS

WCC-1D

Fig. A.4

Well Name: WCC-3DDate: 6-27-89Well Location: 35 feet northwest of WCC-3SSample Depth: 122 feetPerformed By: P. GLAESMAN/H. REYES

Comments: _____



SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT	
		RETAINED (%)	PASSING (%)
18 - .040	--	--	
20 - .033	9	3.6	
30 - .023	10	4.0	
40 - .016	12	4.8	
50 - .012	19	7.6	
60 - .009	20	8.0	
80 - .007	22	8.8	
100 - .006	25	10.0	
200 - .003	122	48.8	
Bottom Pan	250	100.0	

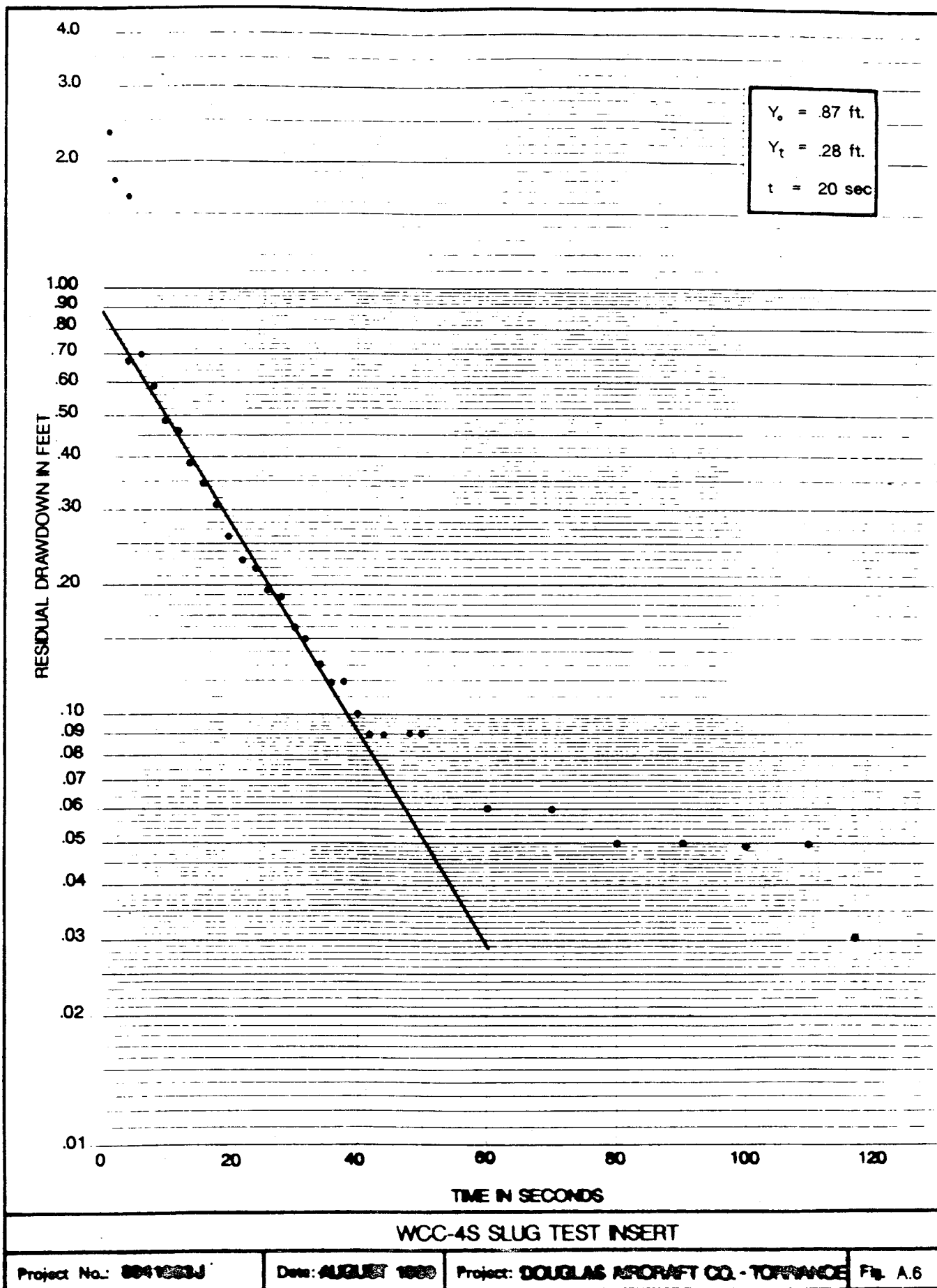
Notes: WET WT. of sample: 300 gmDRY WT. of sample: 250 gm

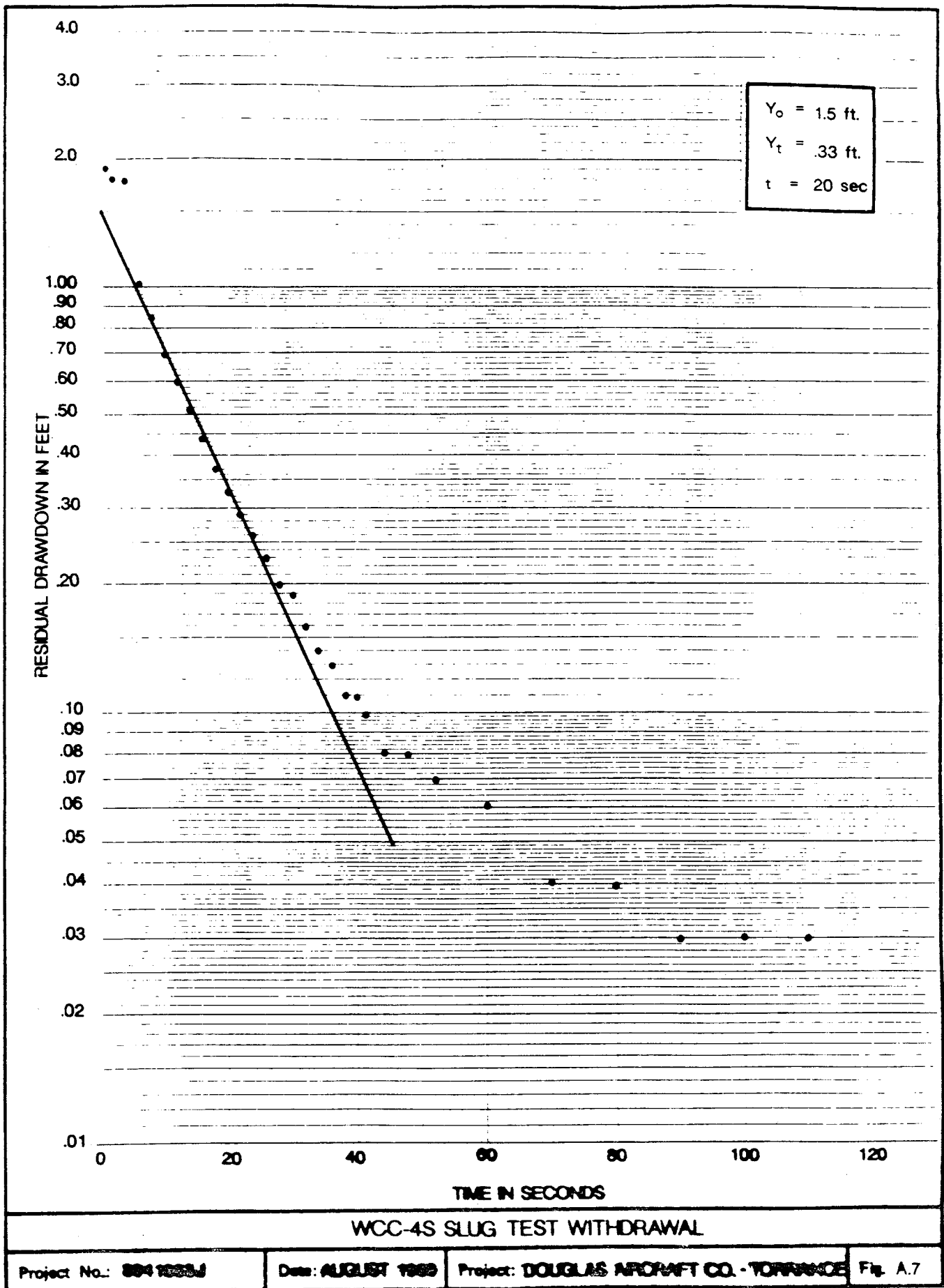
Recommended Slot Opening: _____

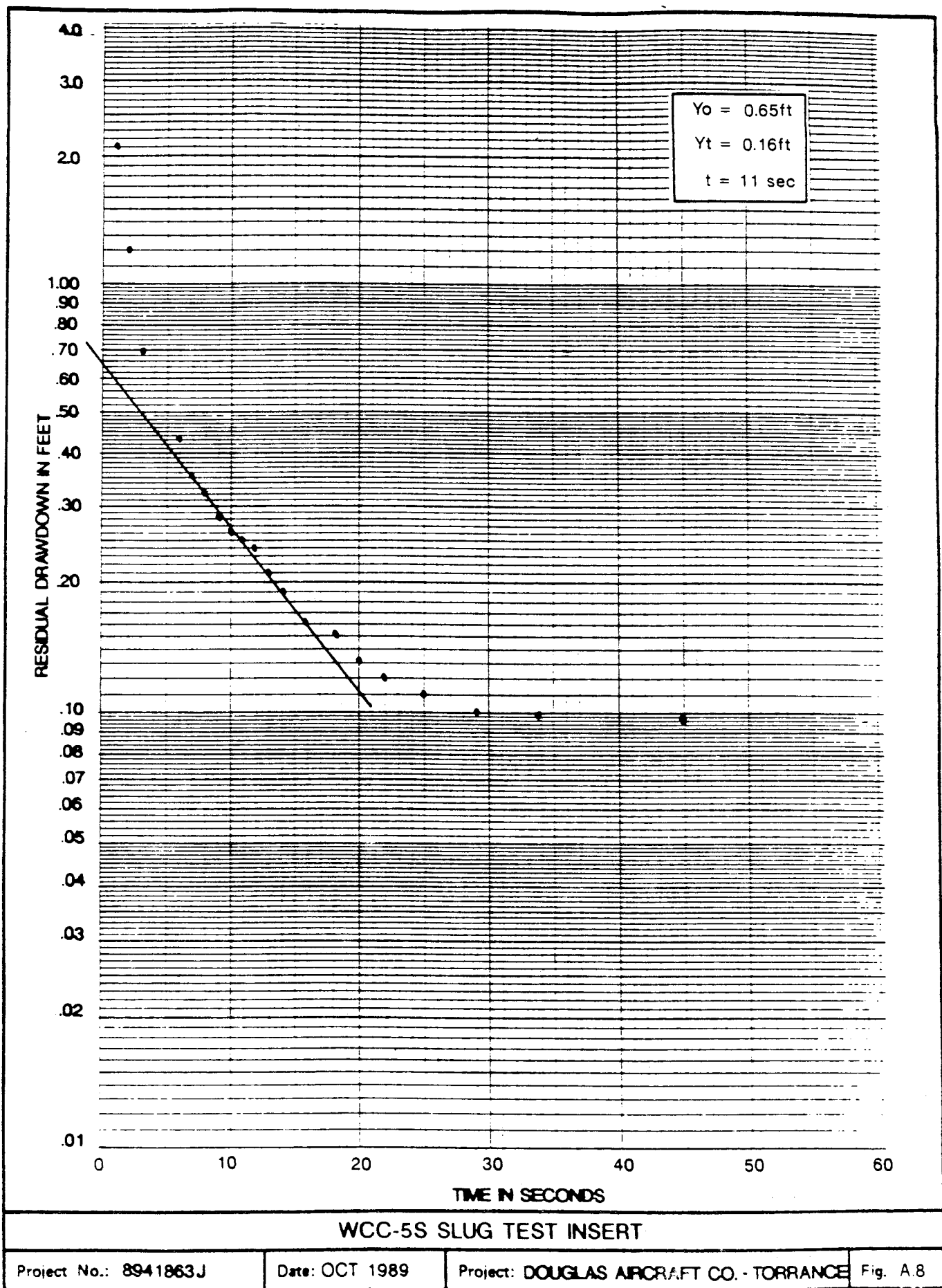
Project DOUGLAS AIRCRAFT CO. - TORRANCE

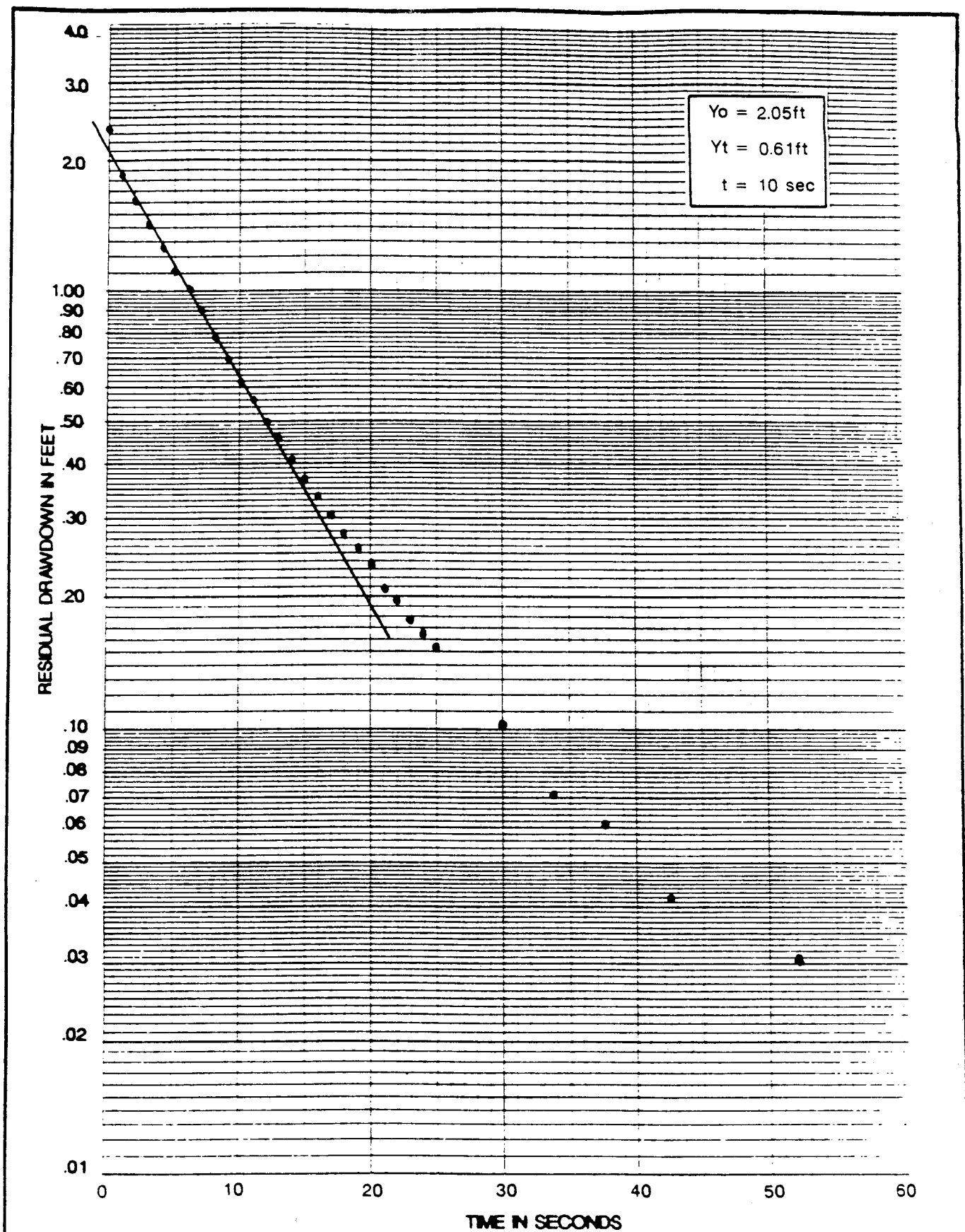
Project No. 8941863J

GRAIN SIZE ANALYSIS**WCC-3D**Fig. **A.5**









WCC-5S SLUG TEST WITHDRAWAL

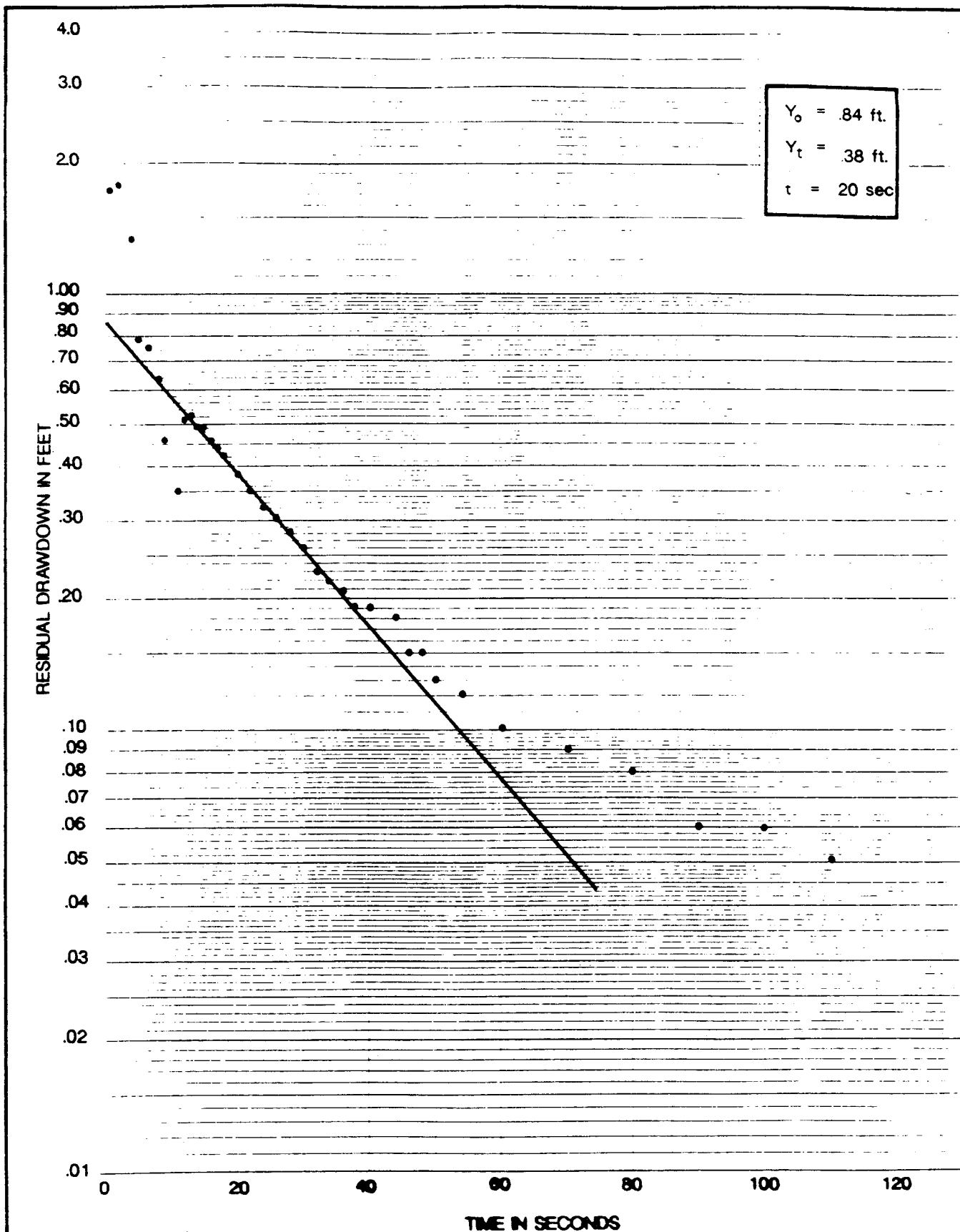
Project No.: 8941863J

Date: OCT 1989

Project: DOUGLAS AIRCRAFT CO. - TORRANCE

Fig. A.9

Woodward-Clyde Consultants



WCC-7S SLUG TEST INSERT

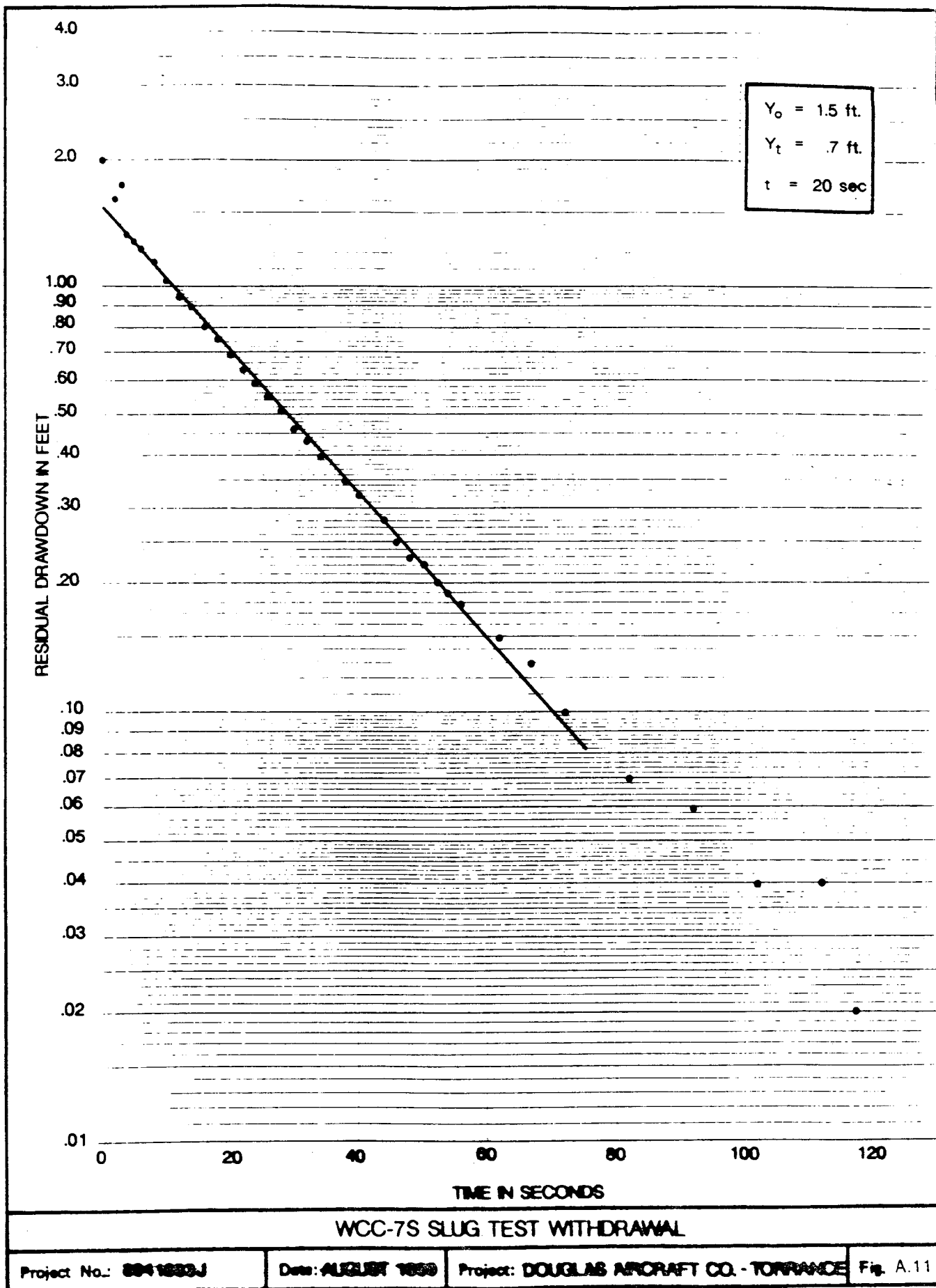
Project No.: **88-1002J**

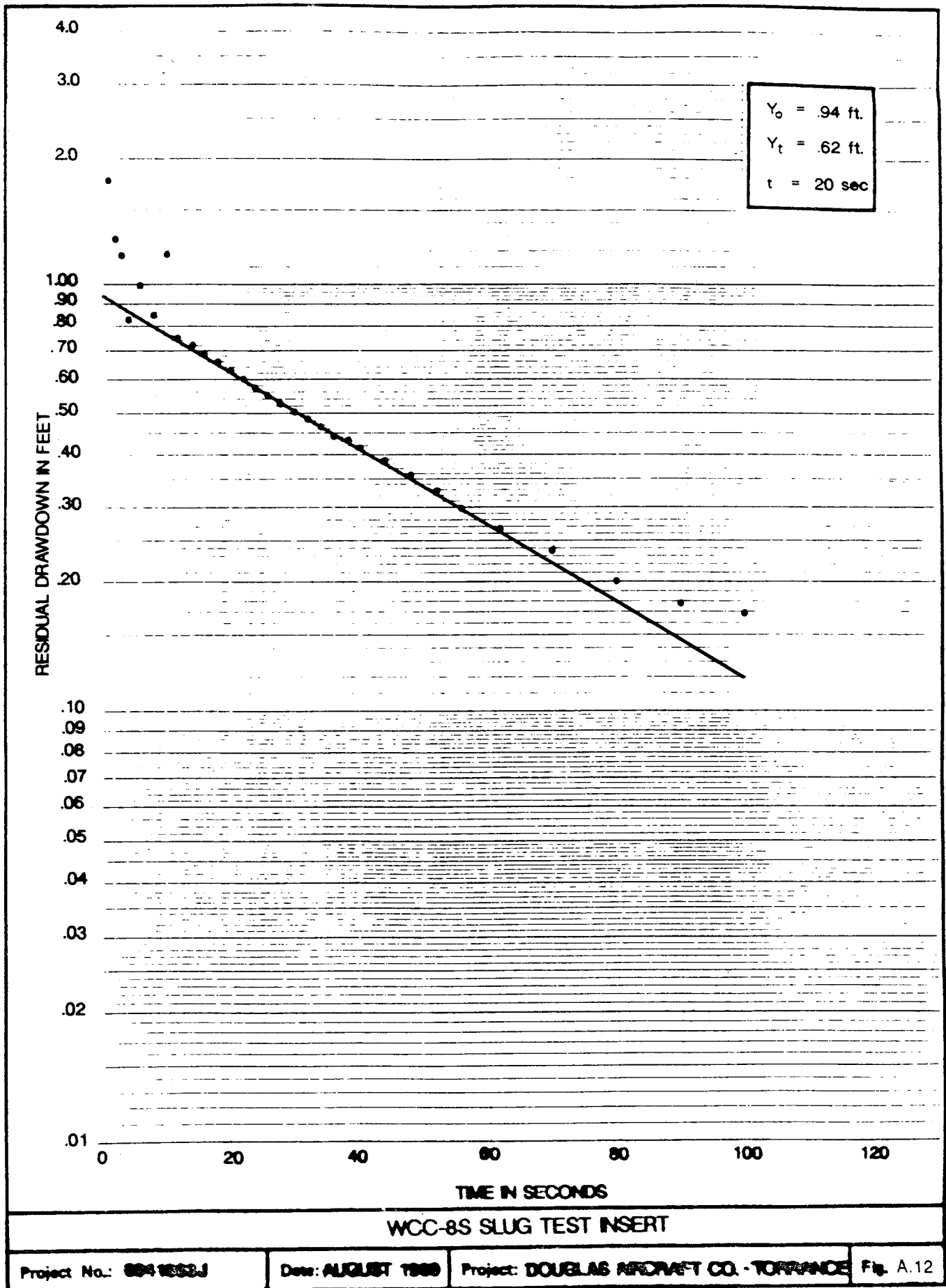
Date: **AUGUST 1988**

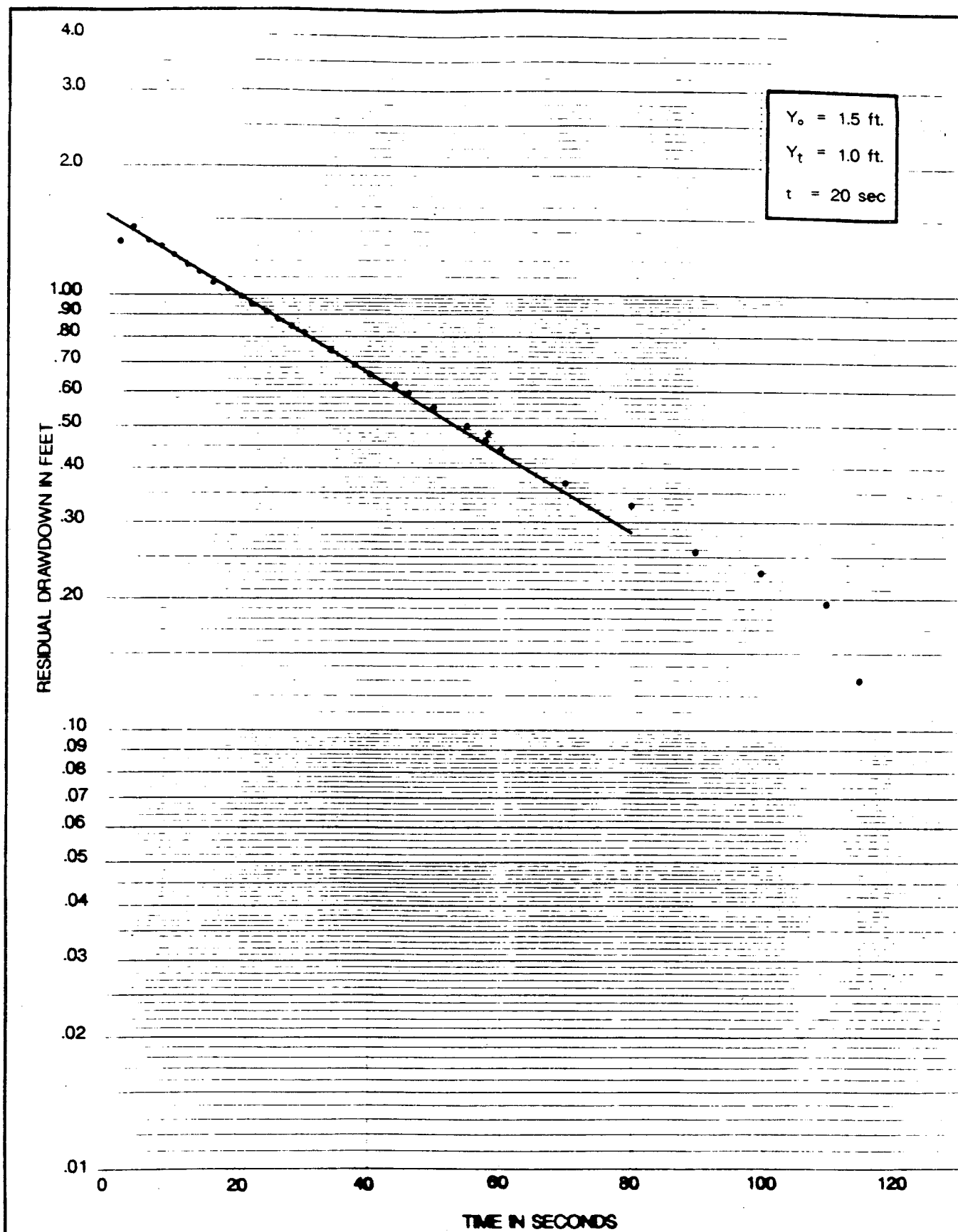
Project: **DOUGLAS AIRCRAFT CO. - TORRANCE**

Fig. A.10

Woodward-Clyde Consultants







WCC-8S SLUG TEST WITHDRAWAL

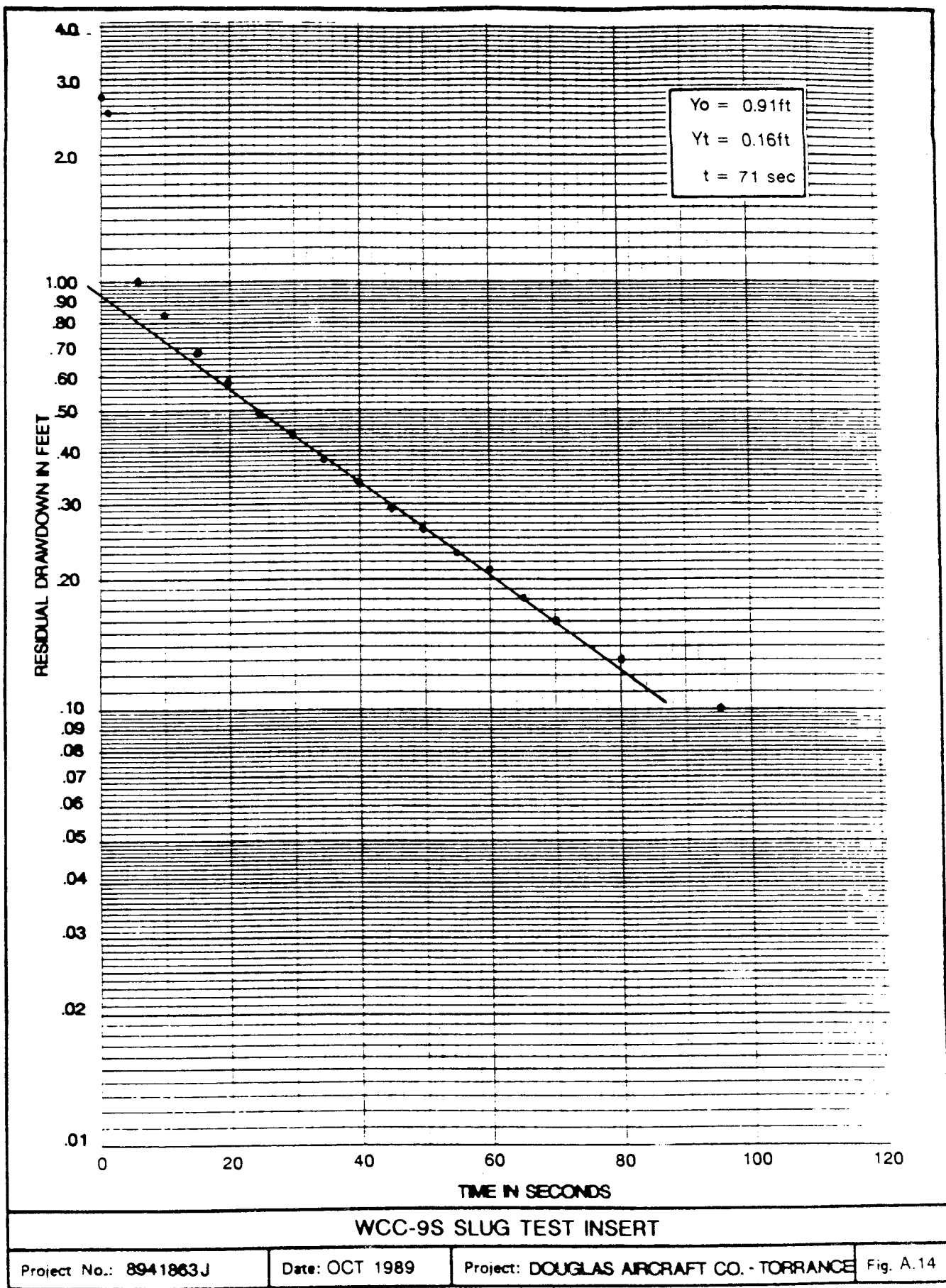
Project No.: 8041883J

Date: AUGUST 1988

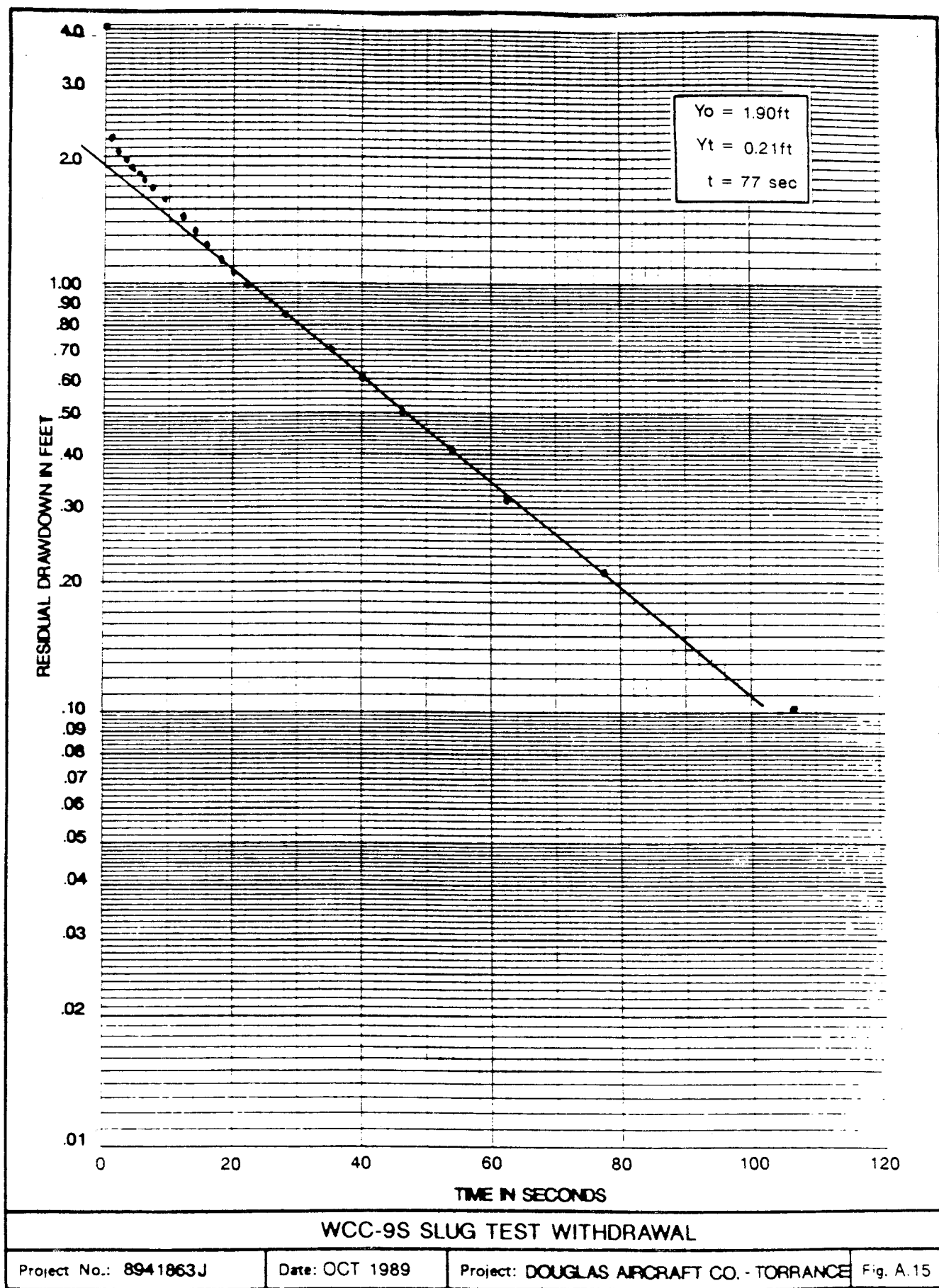
Project: DOUGLAS AIRCRAFT CO. - TORRANCE

Fig. A.13

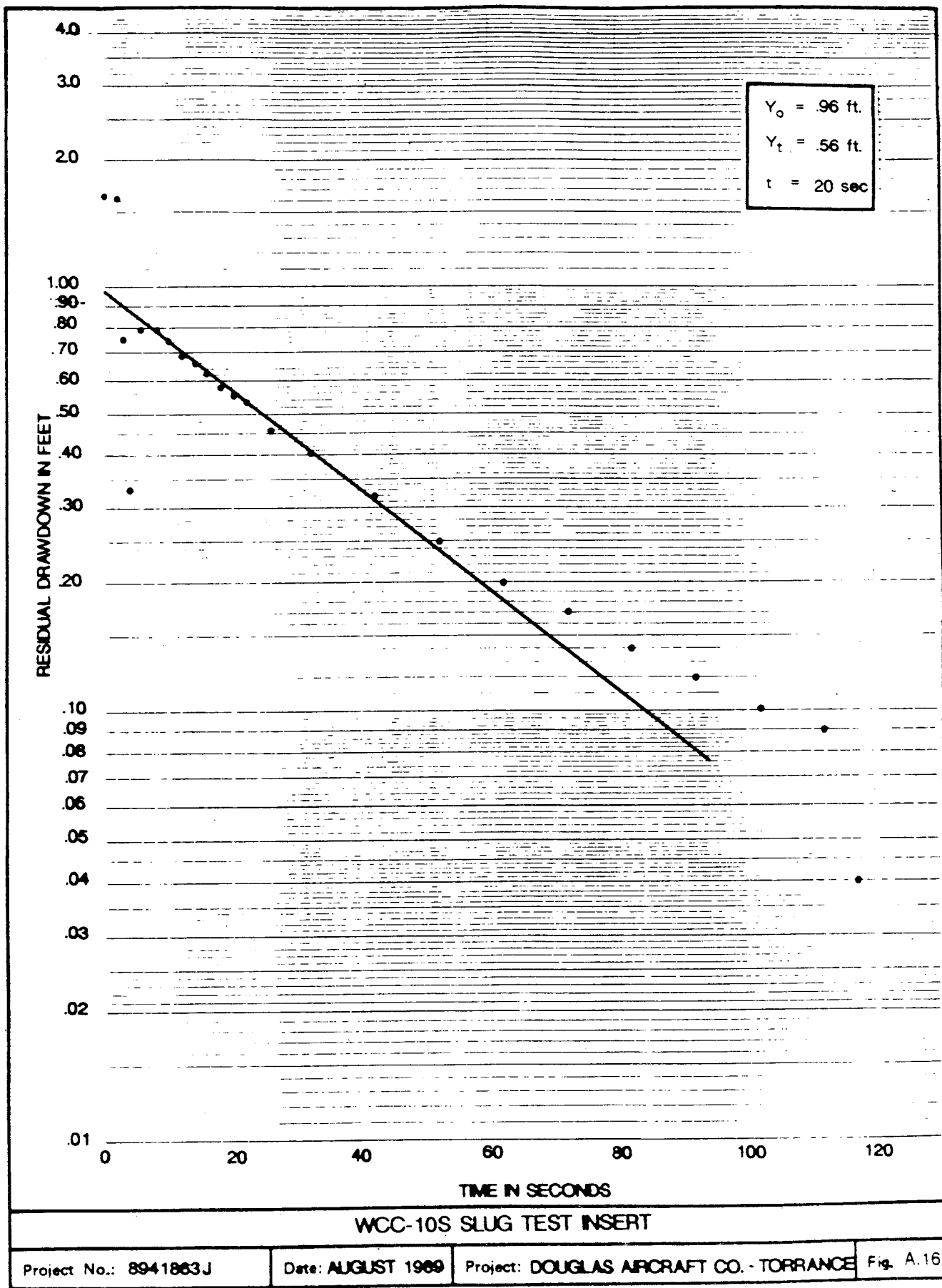
Woodward-Clyde Consultants



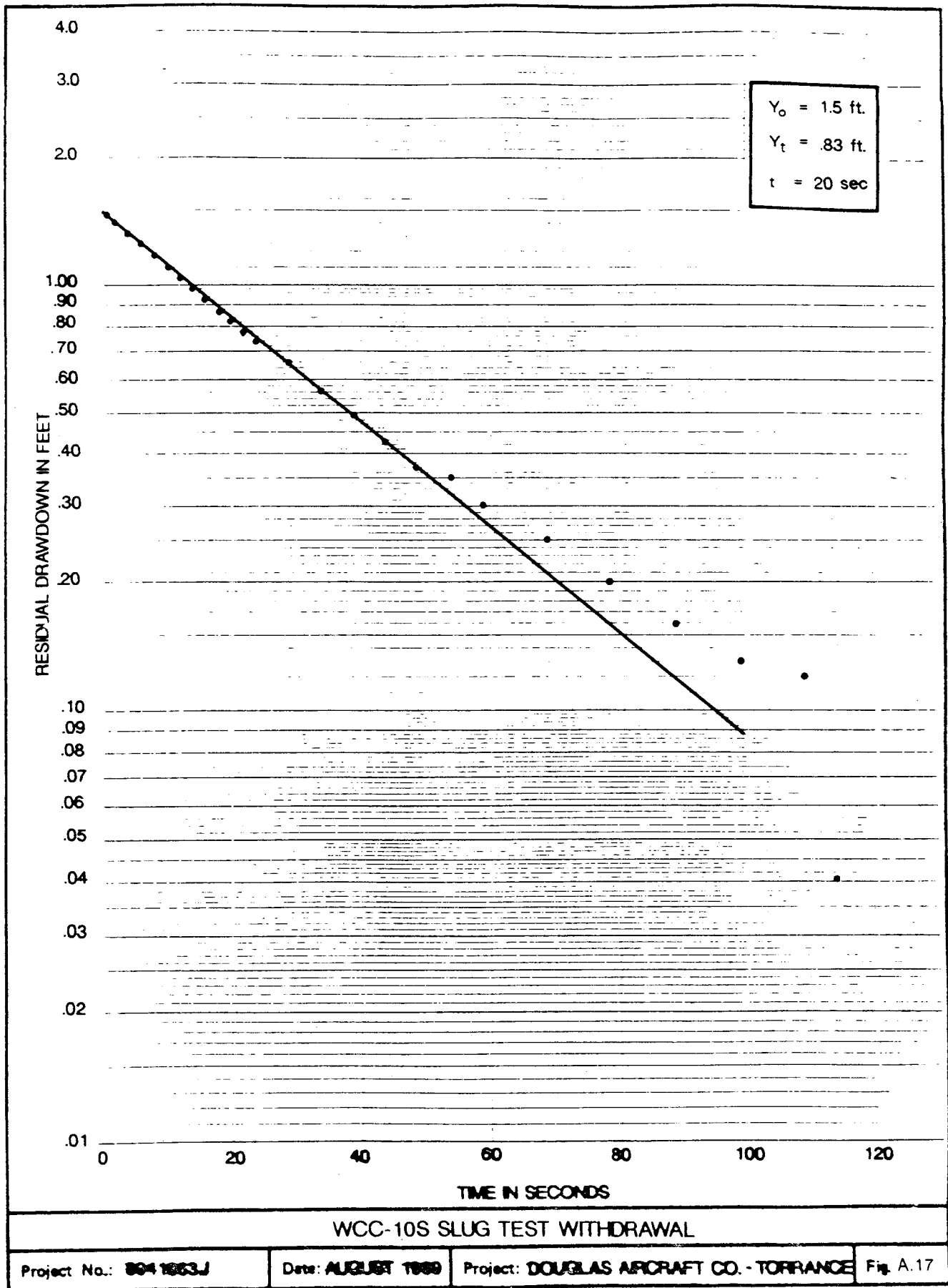
Woodward-Clyde Consultants



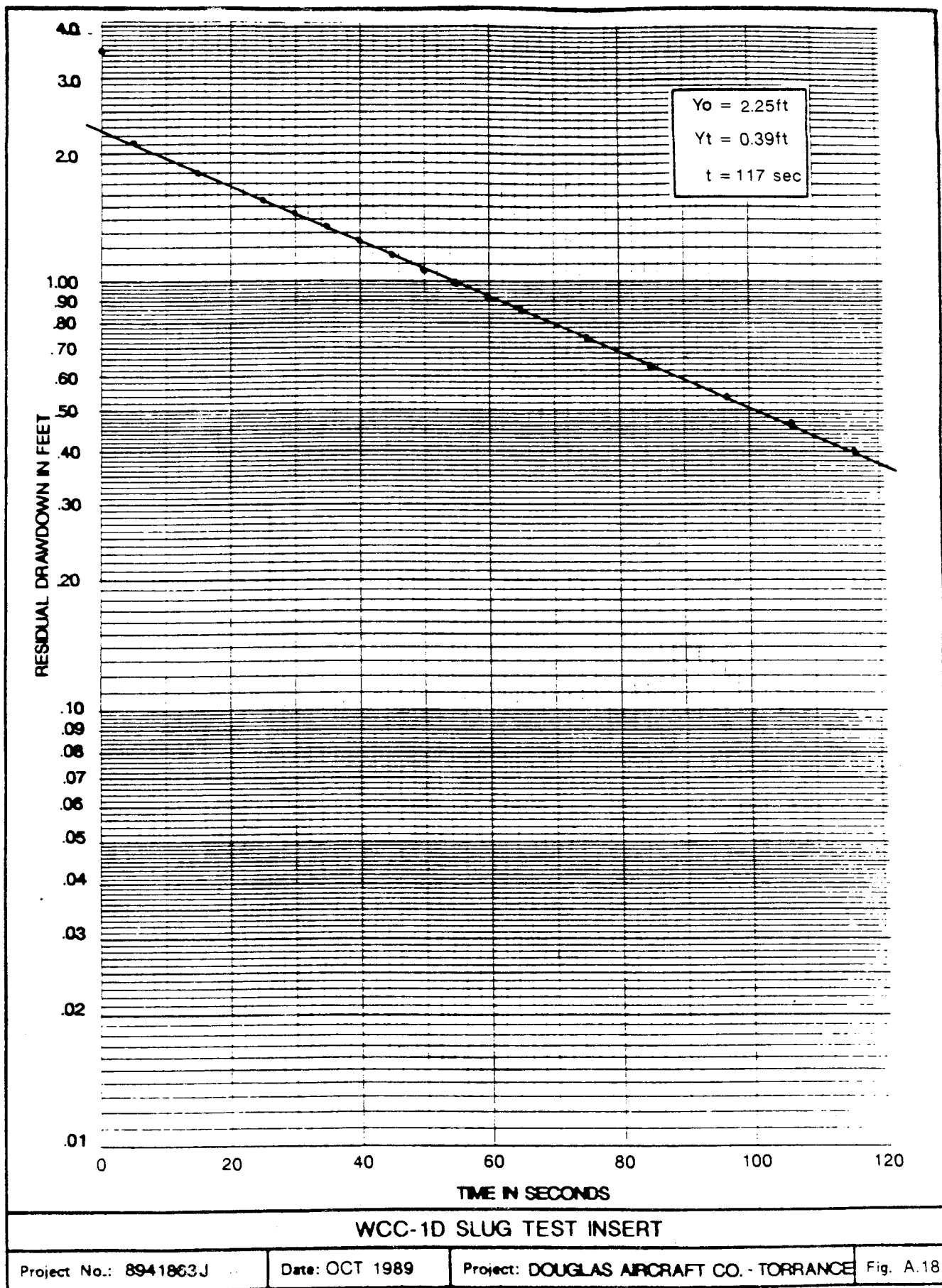
Woodward-Clyde Consultants



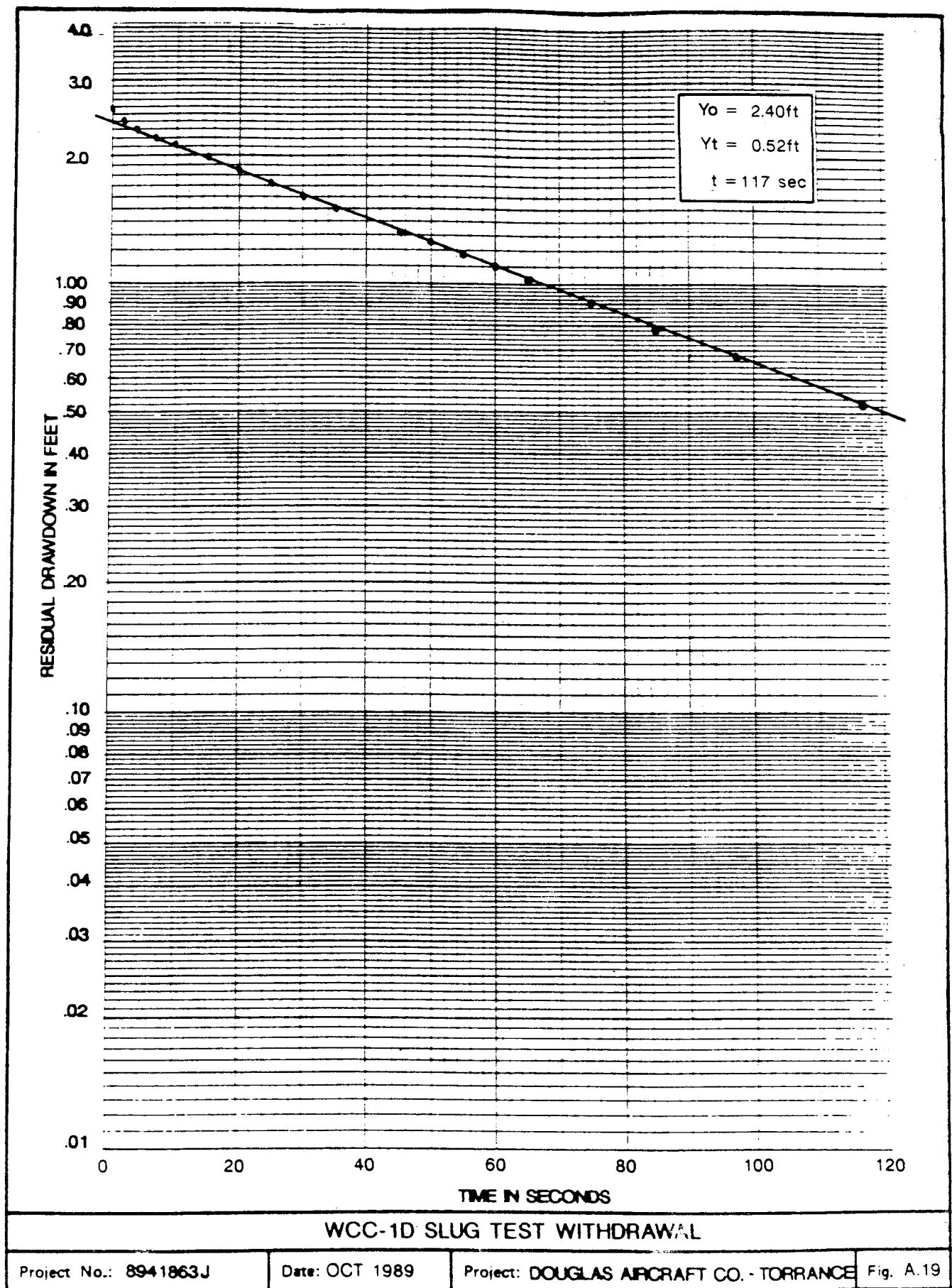
Woodward-Clyde Consultants



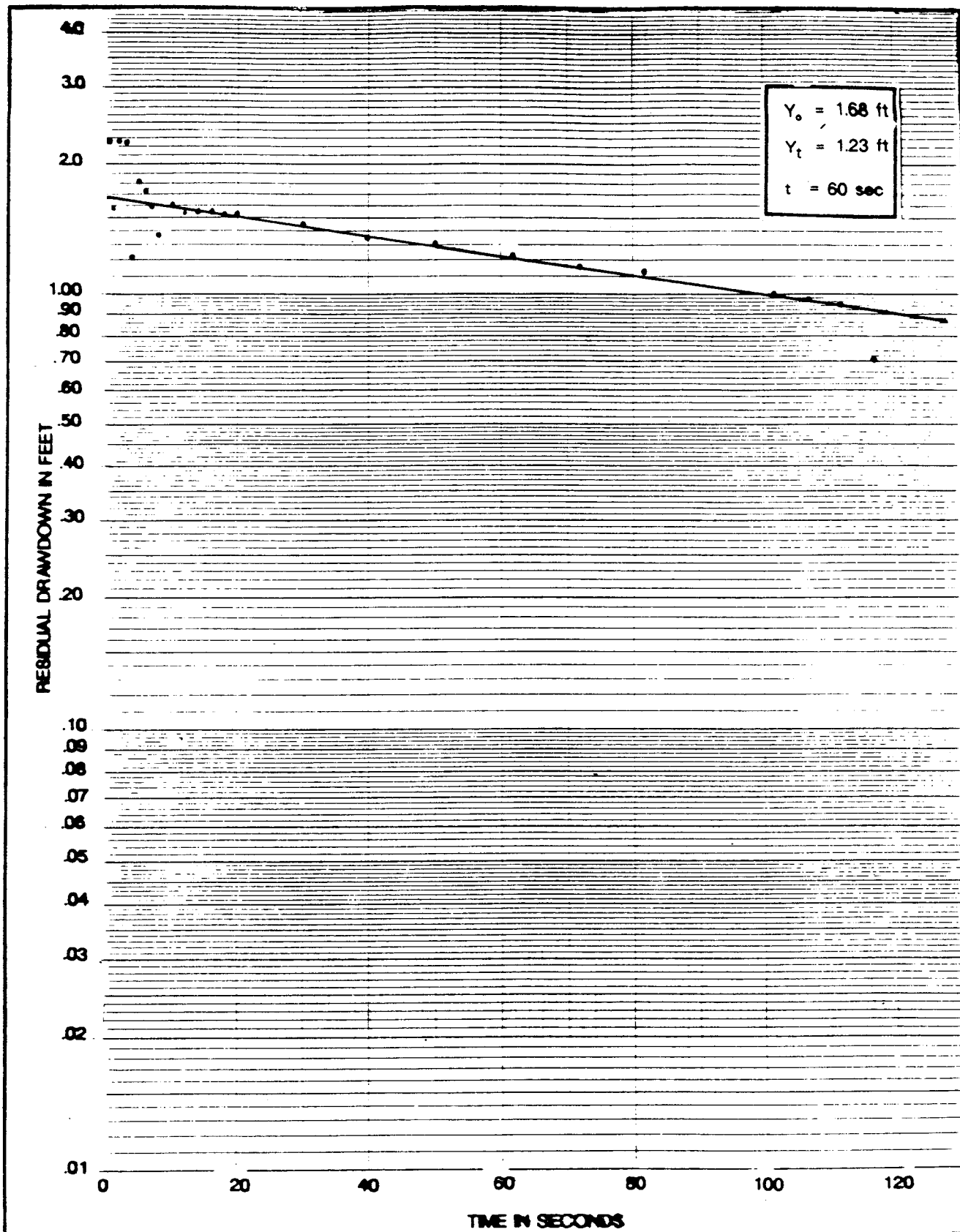
Woodward-Clyde Consultants



Woodward-Clyde Consultants



Woodward-Clyde Consultants



WCC-3D SLUG TEST INSERT

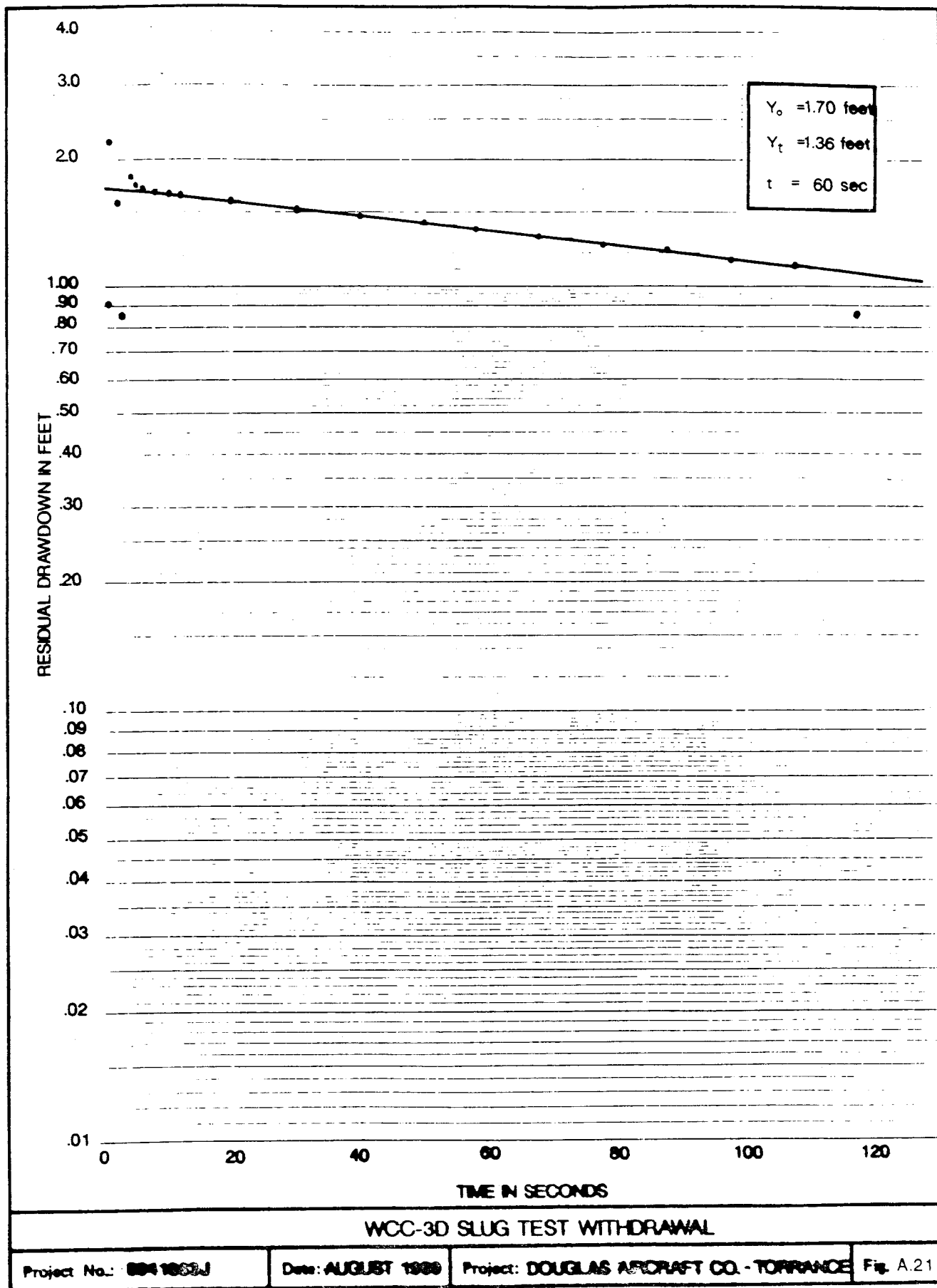
Project No.: 8941863J

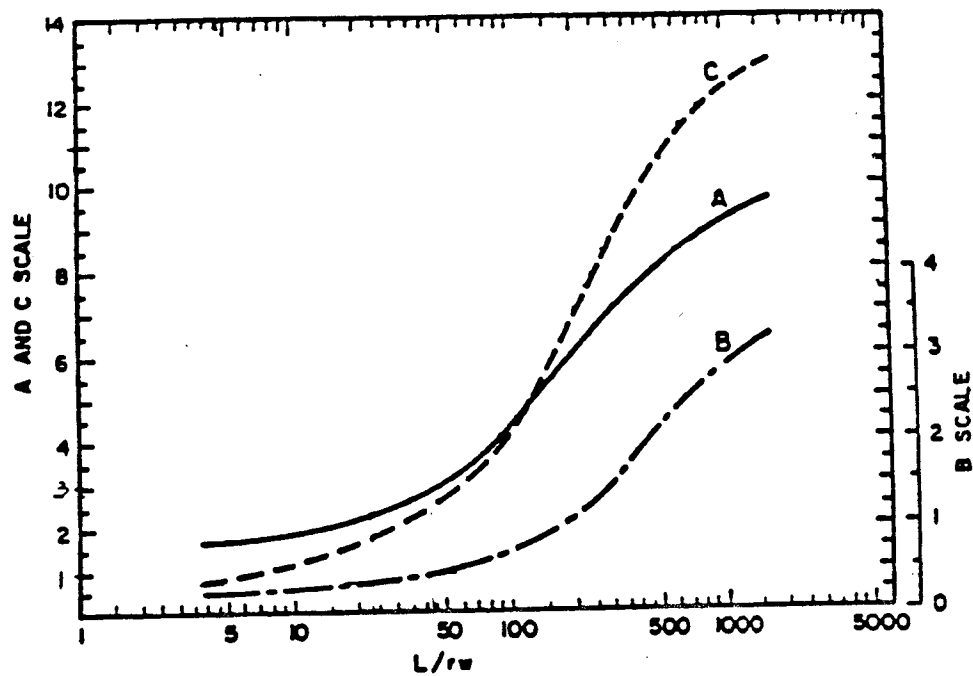
Date: AUGUST 1989

Project: DOUGLAS AIRCRAFT CO. - TORRANCE

Fig. A.20

W. J. Ward-Clyde Consultants





Bouwer and Rice A, B and C Coefficient Curves

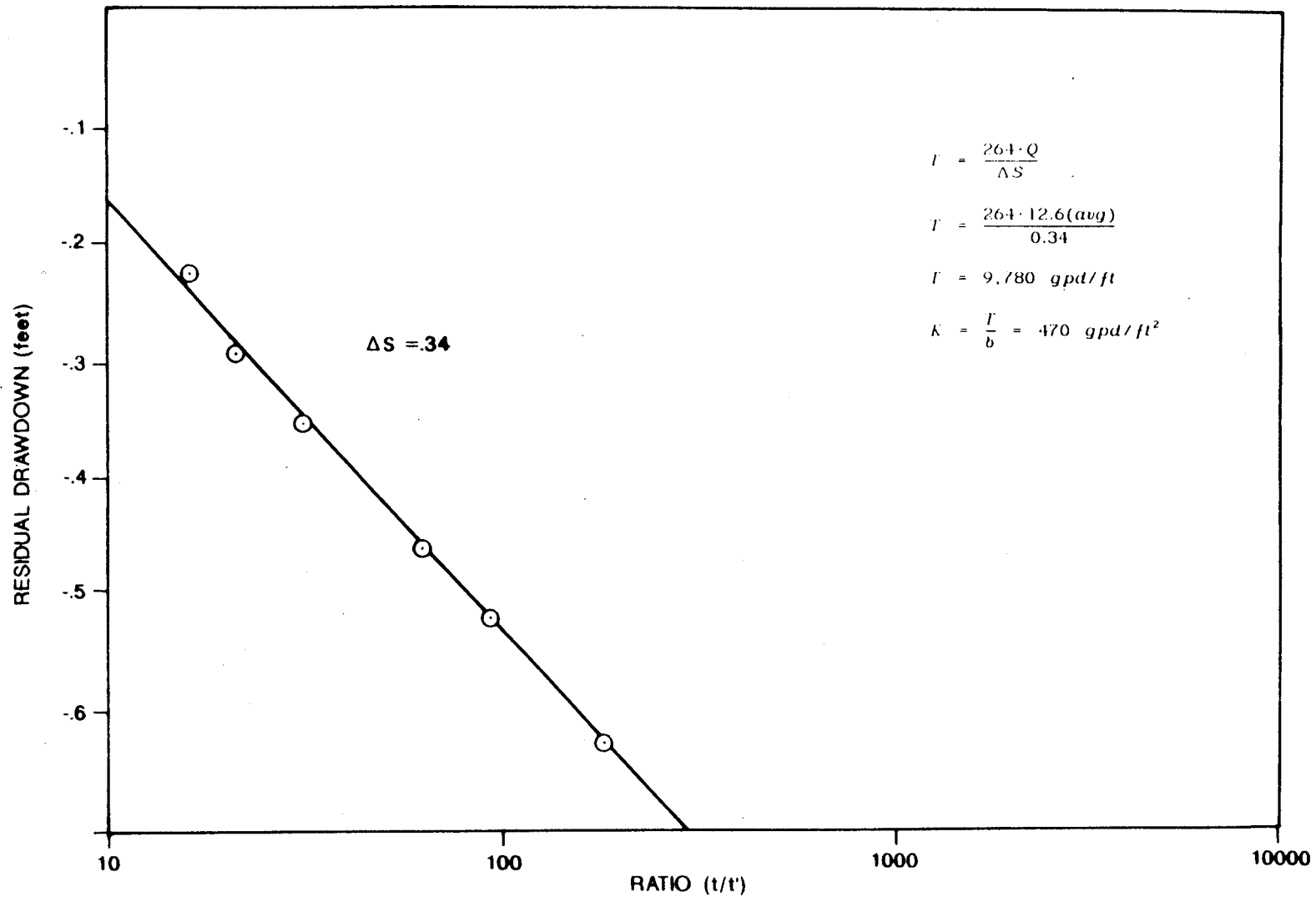
Project No.: 8941863J

Date: AUGUST 1989

Project: DOUGLAS AIRCRAFT COMPANY

Fig. A.22

Woodward-Clyde Consultants



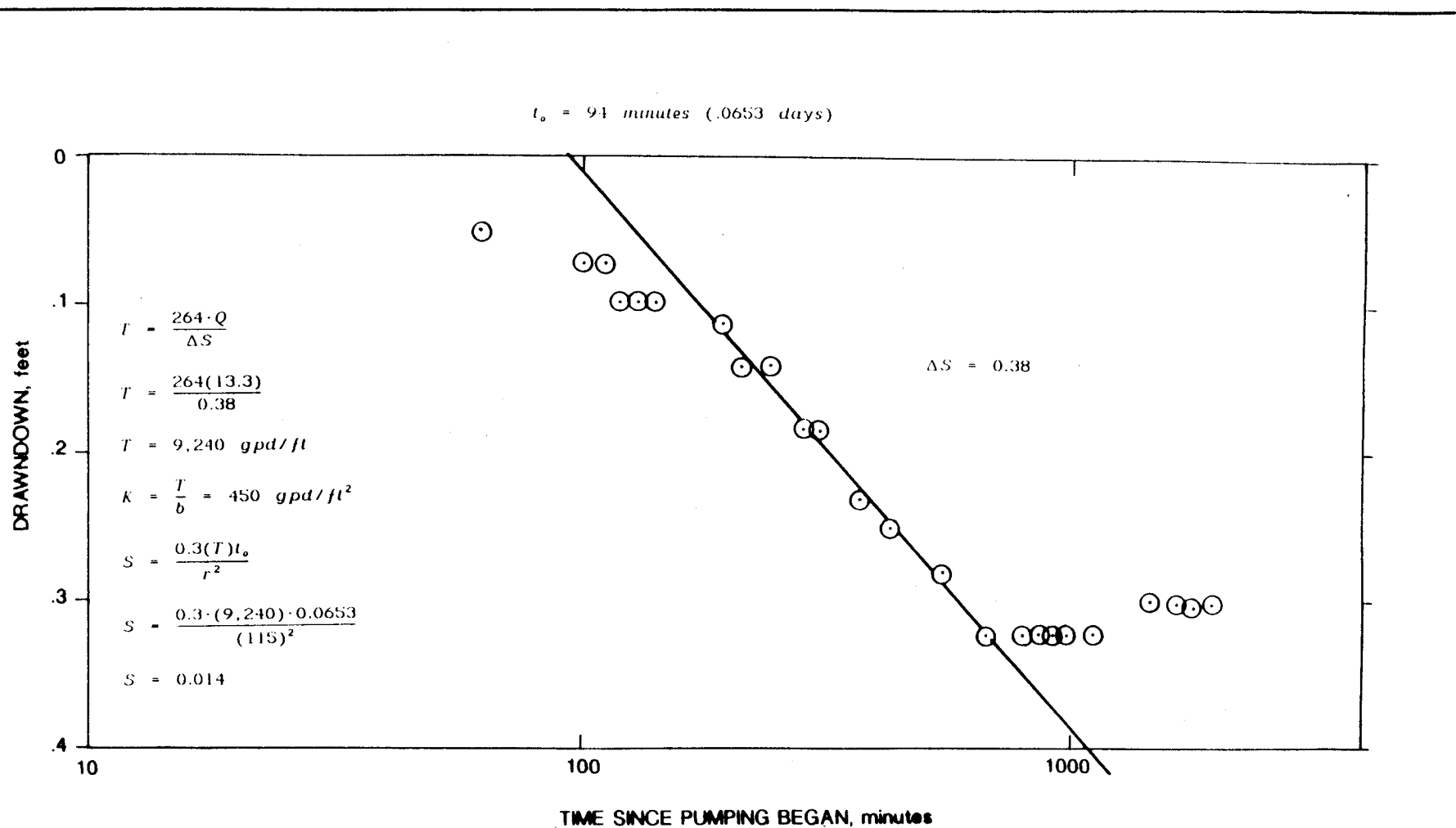
PUMPING WELL (WCC-4S) - RESIDUAL DRAWDOWN PLOT

Project No.: 8941863J

Date: FEB. 1990

Project: DOUGLAS AIRCRAFT CO.

Fig. A-23



WCC-1S: COOPER-JACOB PLOT

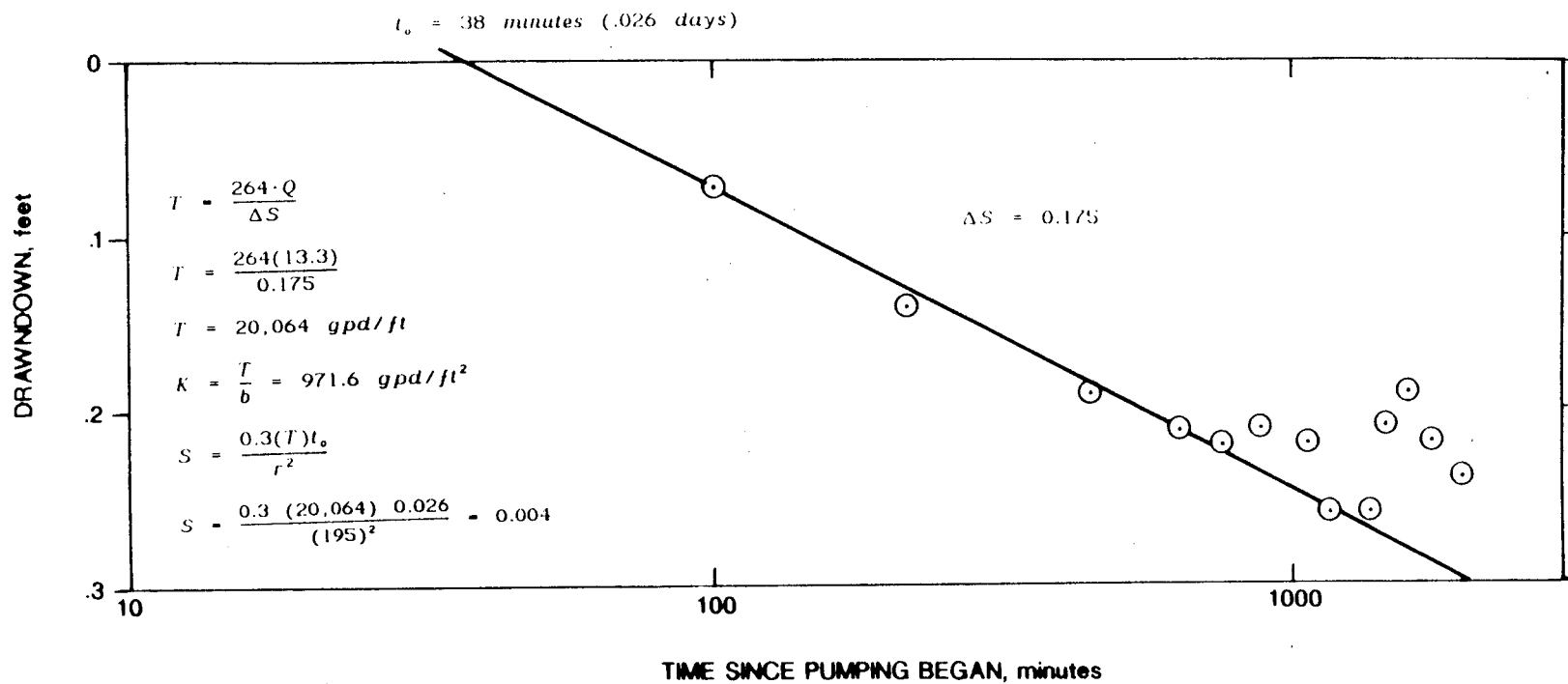
Project No.: 8941863J

Date: MARCH 1990

Project:

DOUGLAS AIRCRAFT CO.

Fig. A-24



WCC-6S: COOPER-JACOB PLOT

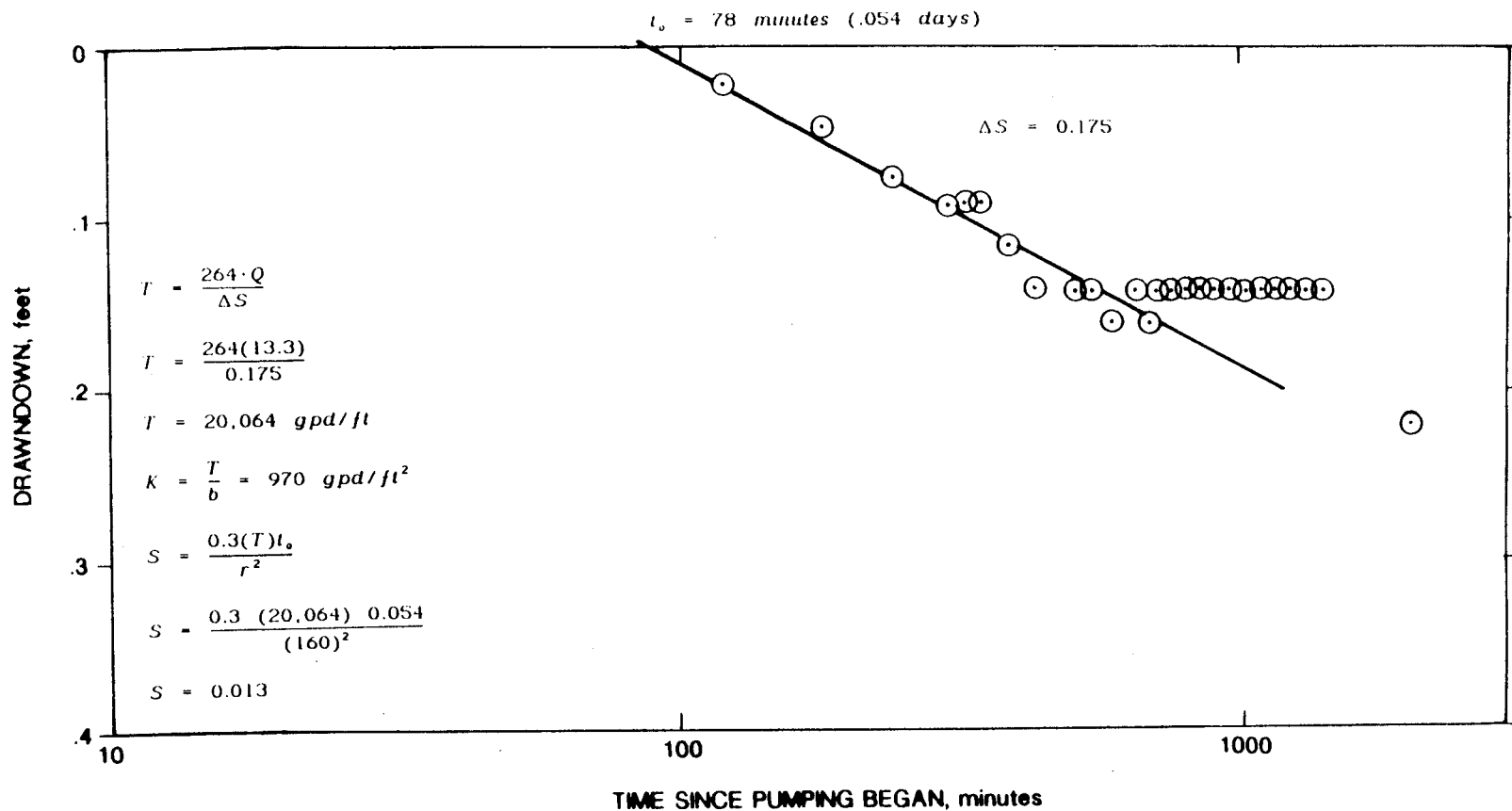
Project No.: **8941863J**

Date: **MARCH 1990**

Project:

DOUGLAS AIRCRAFT CO.

Fig. A-25



WCC-7S: COOPER-JACOB PLOT

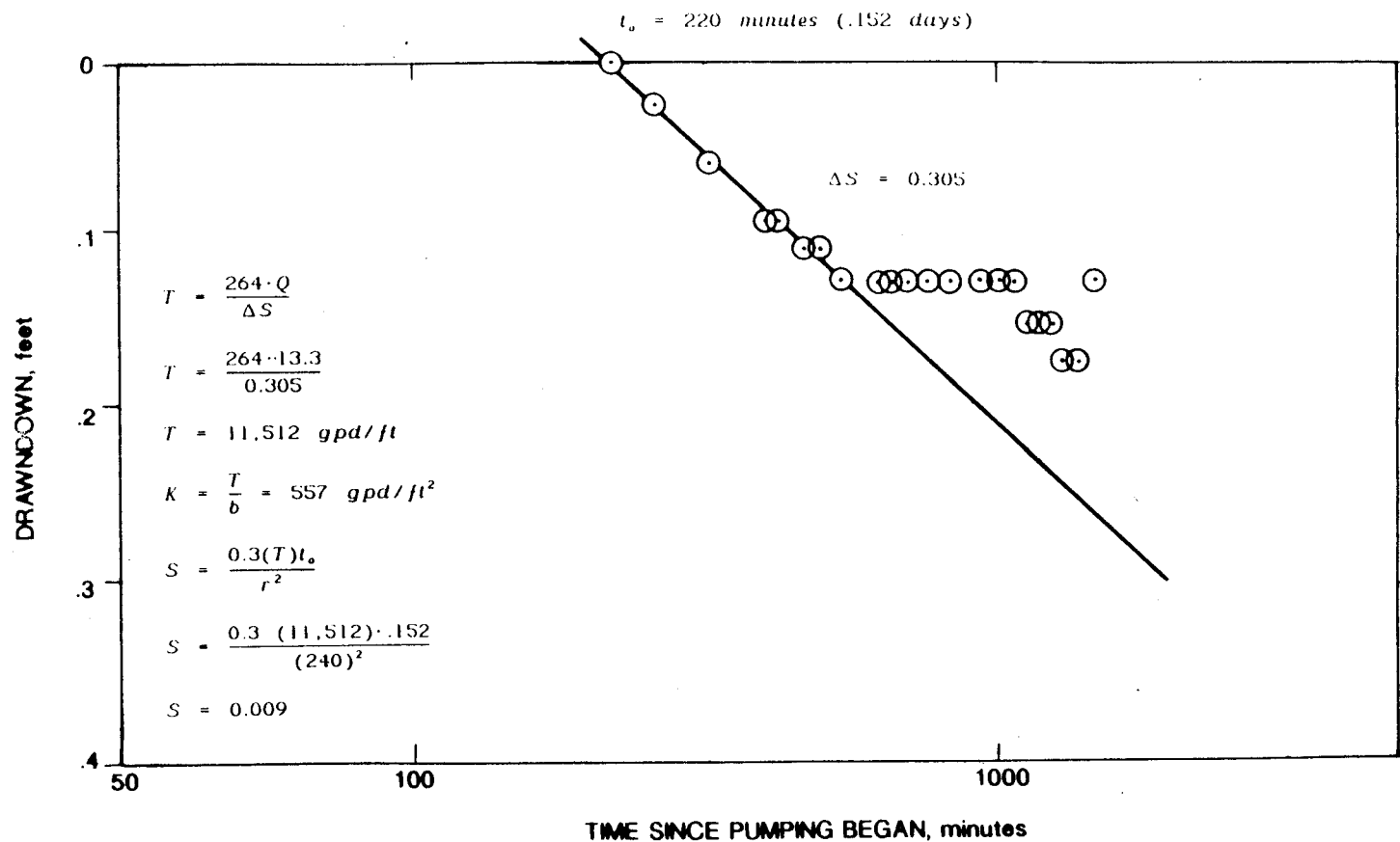
Project No.: 8941863J

Date: MARCH 1990

Project:

DOUGLAS AIRCRAFT CO.

Fig. A-26



WCC-8S: COOPER-JACOB PLOT

Project No.: 8941863J

Date: MARCH 1990

Project:

DOUGLAS AIRCRAFT CO.

Fig. A-27

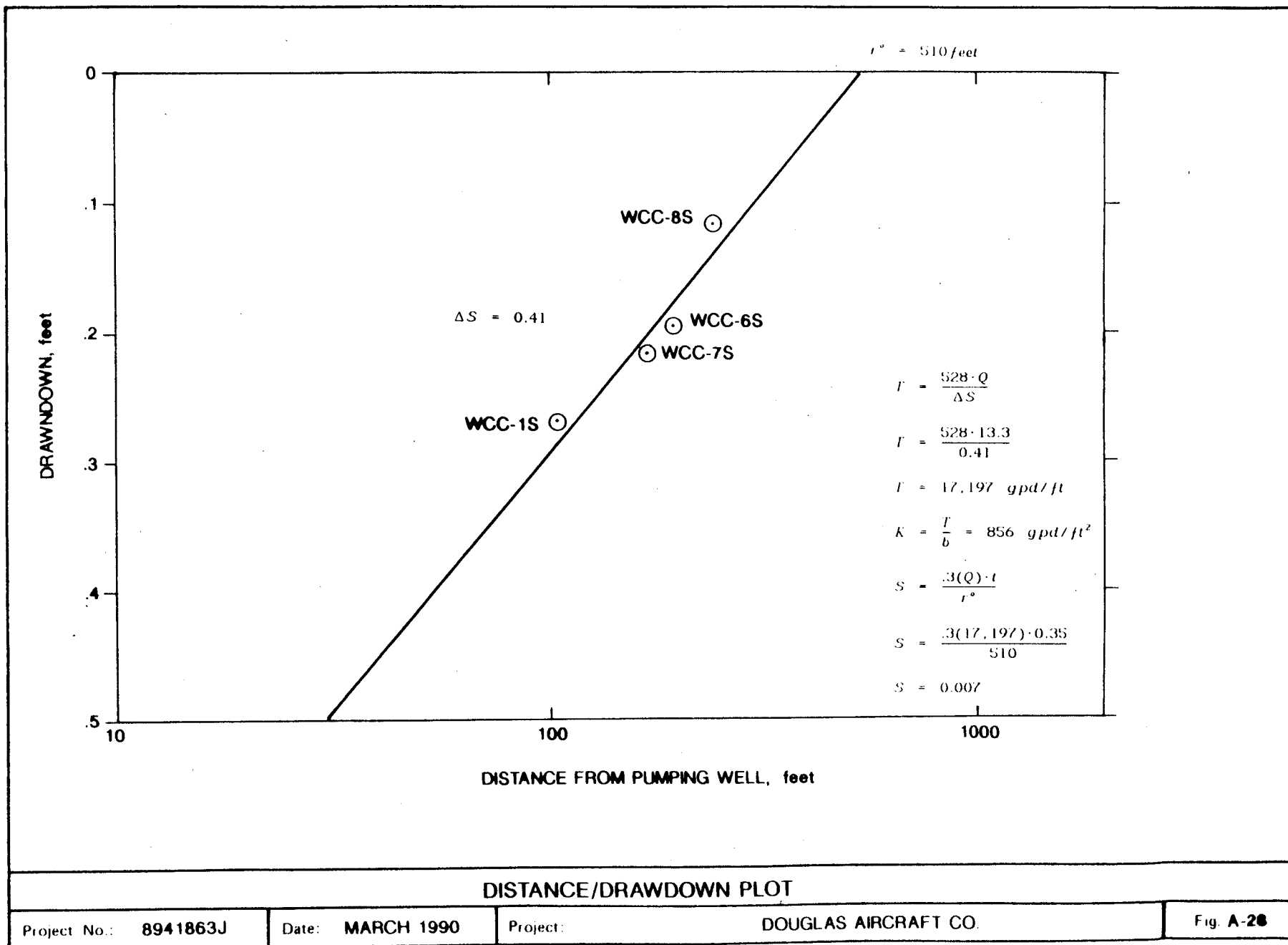


TABLE A-1
WELL DEVELOPMENT SUMMARY
DOUGLAS AIRCRAFT C6 FACILITY

Well No.	Sand Bailer and Surge Block Time (min)	Sand Bailer Volume Removed (gallons)	Pumping Time (min)	Pumping Volume Removed (gallons)	Total Removed (gal)	Comments
WCC-6S	15	45	75	400	445	Water became completely clear.
WCC-7S	60	100	70	500	600	Water became completely clear.
WCC-8S	55	70	90	430	500	Water became completely clear.
WCC-9S	15	60	70	310	370	Water became completely clear.
WCC-10S	95	190	45	370	560	Water became completely clear.
WCC-1D	15	40	540	1,170	1,210	Well was damaged by bailing on 7 July 1989. Well was repaired on 20 July 1989. Well was developed by pumping only, following repair.
WCC-3D	320	500	--	--	500	Water became slightly cloudy. Well was only pumped just before sampling, see Table A-2.

TABLE A-2
WATER SAMPLING DATA
DOUGLAS AIRCRAFT C6 FACILITY

Well No.	Sample Date	Sample Interval (gal)	Electrical Conductivity EC (μmhos)	Total Dissolved Solids TDS (ppm)	pH	Temperature F°
WCC-1S	7/12/89	1		490	9.0	74.5
		4		560	7.2	74.7
		6		540	7.2	74.3
		8		580	7.2	74.7
		10		540	7.2	74.3
	8/23/89	2	1220		7.3	71.1
		4	1320		7.3	71.0
		6	1340		7.3	71.0
		8	1330		7.3	70.6
		10	1330		7.3	70.6
WCC-2S	7/11/89	15		310	7.3	72.1
		25		320	7.2	72.0
		35		320	7.2	72.0
		40		320	7.2	71.6
	8/22/89	10	760		7.2	70.4
		20	760		7.3	70.4
		30	760		7.3	70.2
		40	760		7.3	70.2
WCC-3S	7/12/89	10		550	6.8	73.9
		20		550	6.7	73.4
		30		560	6.7	73.4
		40		560	6.7	73.4
	8/23/89	10	1270		6.8	70.5
		20	1270		6.8	69.9
		30	1280		6.9	70.2
		40	1280		6.9	70.2
WCC-4S	7/11/89	15		430	7.2	72.7
		25		440	7.2	72.9
		35		420	7.2	72.9
		45		450	7.2	73.0
	8/23/89	10	960		7.2	69.8
		20	990		7.2	69.8
		30	1000		7.2	69.2
		40	1005		7.2	69.4
WCC-5S	7/11/89	15		380	7.3	73.4
		25		370	7.3	72.0
		35		390	7.3	72.1
		45		390	7.3	72.3
	8/22/89	15	885		7.2	69.1
		25	900		7.3	69.1
		35	900		7.3	69.2
		45	900		7.3	69.4
WCC-6S	10/6/89	10	1,180		7.0	69.7
		20	1,190		7.1	69.7
		30	1,190		7.1	69.8
		40	1,190		7.1	69.8

TABLE A-2 (continued)

Well No.	Sample Date	Sample Interval (gal)	Electrical Conductivity EC (μ mhos)	Total Dissolved Solids TDS (ppm)	pH	Temperature F°
WCC-7S	7/11/89	15		540	7.2	72.5
		25		520	7.1	72.5
		35		510	7.2	72.7
		45		510	7.2	72.5
	8/23/89	10	1180		7.1	68.8
		20	1225		7.1	69.0
		30	1220		7.2	68.8
		40	1200		7.2	69.5
WCC-8S	7/11/89	15		390	7.3	72.5
		25		390	7.2	72.7
		35		380	7.2	72.5
		45		380	7.2	72.7
	8/23/89	10	880		7.2	69.9
		20	865		7.2	69.6
		30	865		7.2	69.6
		40	875		7.3	69.6
WCC-9S	10/6/89	15	1,110		7.1	69.1
		25	1,070		7.2	69.2
		35	1,050		7.2	69.0
		45	1,000		7.2	69.1
WCC-10S	7/11/89	1		420	7.2	70.9
		10		450	7.3	70.3
		25		420	7.3	70.3
		35		410	7.3	70.7
		40		410	7.2	70.5
		45		420	7.2	70.5
	8/22/89	10	1000		7.2	69.1
		20	1010		7.2	69.1
WCC-1D	7/24/89	30	1040		7.3	68.9
		40	1040		7.3	68.8
		15	760		7.2	70.6
		75	720		7.3	71.0
		175	770		7.4	71.3
		275	770		7.5	71.1
	8/21/89	350	770		7.5	71.1
		20	760		7.4	70.1
		40	756		7.4	69.6
		60	730		7.4	69.7
		80	730		7.5	69.2
		100	720		7.4	69.7
		120	720		7.4	69.8
		135	720		7.4	69.8
	7/25/89	10	770		7.4	69.6
		50	760		7.2	70.2
		100	780		7.4	70.3
		200	760		7.6	70.4
		300	750		7.4	71.9
		400	750		7.6	70.2
		500	750		7.8	70.8
	8/21/89	20	710		7.3	69.5
		40	715		7.4	69.2
		60	715		7.4	69.3
		80	720		7.4	69.0
		100	720		7.4	69.3
		120	715		7.4	69.8
		140	715		7.4	69.1

TABLE A-3
SUMMARY OF WELL CONSTRUCTION DETAILS










Well No.	Distance from WCC-4S* (feet)	Depth of Well (feet)	Screened Interval (feet)	Screen Slot Size (inches)	Diameter of Well Casing (inches)	Diameter of Filter Pack (inches)	Filter Pack Material
WCC-1S	115	88.5	78.5-88.5	0.01	2	10	No. 12 Silica sand
WCC-2S	675	90.5	70.5-90.5	0.01	4	10	No. 0/30 Lonestar sand
WCC-3S	220	89	69-89	0.01	4	10	No. 0/30 Lonestar sand
WCC-4S (pumping well)	--	90.5	70.5-90.5	0.01	4	10	No. 0/30 Lonestar sand
WCC-5S	250	91	61-91	0.01	4	10	No. 0/30 Lonestar sand
WCC-6S	200	91	60-90	0.01	4	11	No. 0/30 Monterey sand
WCC-7S	160	90	59.5-89.5	0.01	4	10	No. 0/30 Lonestar sand
WCC-8S	240	89.5	60-90	0.01	4	10	No. 0/30 Lonestar sand
WCC-9S	525	90	120-140	0.01	4	10	No. 0/30 Monterey sand
WCC-10S	2,020	90	60-90	0.01	4	10	No. 0/30 Lonestar sand
WCC-1D	100	140	120-140	0.01	4	10	No. 0/30 Lonestar sand
WCC-3D	250	140	120-140	0.01	4	10	No. 0/30 Lonestar sand

* Measured from well locations plotted on site map provided by DAC.

APPENDIX B
BORING LOGS

(2L-ABC/C6GW3-AA)

BORING LOCATION		ELEVATION AND DATUM	
DRILLING AGENCY	DRILLER	DATE STARTED	DATE FINISHED
DRILLING EQUIPMENT		COMPLETION DEPTH (ft)	ROCK DEPTH (ft)
TYPE OF WELL CASING	SCREEN PERFORATION	DIAMETER OF BORING (in.)	DIAMETER OF WELL (in.)
No. OF SAMPLES	DIST.	UNDIST.	CORE
WATER DEPTH (ft)	FIRST	COMPL.	24 HRS.
		LOGGED BY	CHECKED BY

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION				Drilling Rate (Time)	REMARKS
			No.	Type	Blow Count	O.V.A. (ppm)		
	Medium dense, moist, light brown, SILTY fine grained SAND (SM). ←							
	Unified Soil Classification System (USCS). _____							
	Sample Identification Number. _____							
5	Sample Location and Type. _____							
	 Concrete							
	 Bentonite Pellets							
10	 Native Soil							
	 Monterey No. 0/30 Sand Filter Pack							
	 Screen							
15	 Modified California Sampler.							
	 Bentonite (Void) Grout							
20	 Pea Gravel (1/4"-1/2")							
	 Continuous Core Sample							
25	Number of Blows Required to Advance Sampler One Foot using a 140 Pound Downhole Hammer with a 30-inch Drop. _____							
	Organic Vapor Analyzer (OVA) Readings (field headspace). _____							
30	Rate at which Drilling Progresses. _____							
	Time at depths noted. _____							
	Remarks or Comments by Driller or Drilling Supervisor. _____							
35								

Project: DOUGLAS AIRCRAFT COMPANY-TORRANCE
Project No.: 8941863U

KEY TO BORING LOG

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION		See Location Map		ELEVATION AND DATUM		Approximately 51 Feet above MSL				
DRILLING AGENCY	A & R Drilling, Inc.		DRILLER	M. Romero		DATE STARTED	6-13-89	DATE FINISHED	6-13-89	
DRILLING EQUIPMENT	CME 75 with 3-inch O.D., H.S.A.				COMPLETION DEPTH (ft)	66.5		ROCK DEPTH (ft)	-	
TYPE OF WELL CASING	-		SCREEN PERFORATION	-		DIAMETER OF BORING (in)	8		DIAMETER OF WELL (IN)	-
TYPE SIZE OF SAND PACK	-		TYPE THICKNESS OF SEALS	Backfilled with dry mixture of Sand and Bentonite						
NO. OF SAMPLES	DIST.	0	UNDIST.	1	CORE	0		LOGGED BY	CHECKED BY	
WATER DEPTH (ft)	FIRST	-	COMPL	-	24 HRS	-		P. Giesman H. Reyes	M. Rozmajec	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space -	Back -		
	5-inch Asphalt concrete.										
	Loose, moist, olive brown, fine to medium grained SAND to SILTY SAND (SP-SM).			1	X	7	100		10	0802	
	Very loose, moist, olive brown, medium grained SAND (SP).			2	X	2	120		10	0815	
5											
	Stiff to hard, moist, dark olive gray, CLAY (CH).			3	X	11	1000+		10	0819	
	Medium dense, moist, dark yellowish brown, SILTY fine grained SAND (SM), to SANDY SILT (ML).			4	X	13	1000+		10	0824	
15	↓ Becomes discolored to dark olive gray, with trace of clay.										Strong chemical odor
	Stiff to very stiff, moist, dark yellowish brown to olive brown, SILTY CLAY (CL).										
				5	X	11	1000+		10	0900	
20											
	Medium stiff to stiff, very moist, olive brown, SANDY SILT (ML).			6	X	7	1000+		10	0910	
25											
	Loose, moist, light gray, CLAYEY fine grained SAND (SC).			7	X	5	1000+		10	0917	Encountered mixture of silica sand and bentonite powder. It is probably the backfill material from adjacent boring.
30											
	Very soft, very moist, olive brown, SILTY CLAY to CLAYEY SILT (CL-ML).										
35				8	X	1	1000+		10	0925	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING

B-6 Fig
B-2

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space -	Back -		Ground
	Very soft, very moist, olive brown, SILTY CLAY to CLAYEY SILT (CL-ML).										
	Very soft, saturated with chemicals, olive brown, SANDY SILT (ML).										
40	Hard, moist, olive brown, SILTY CLAY (CL).			9	X	30	1000+	10	0935		
	Iron oxide stains and root holes.										
45				10	X	23	1000+	10	0950		
	Dense, moist, olive brown and yellowish brown, mottled, SILTY fine grained SAND (SM), iron oxide staining and trace of clay.										
50				11	X	44	1000+	10	0958		
	Dense, moist, yellowish brown, fine grained SAND (SP-SM), micaceous.										
55				12	X	33	1000+	10	1013		
	Hard, very moist, olive to olive brown, SANDY SILT (ML), (SILTSTONE?), micaceous, with iron oxide staining.										
60				13	X	42	1000+	10	1024		
	Becomes more sandy, grading to SILTY SAND (SM).										
65				14	X	39	1000+	10	1039		
	Bottom of Boring at 66.5 feet.										
70											
75											

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 8941863J	CONT. LOG OF BORING B-6	Fig. B-3
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BORING LOCATION		See Location Map		ELEVATION AND DATUM		Approximately 51 Feet above MSL	
DRILLING AGENCY		A & P Drilling, Inc.		DRILLER		M. Romero	
DRILLING EQUIPMENT		CME 75 with 3-inch O.D., H.S.A.		DATE STARTED		6-13-89	
TYPE OF WELL CASING		-		DATE COMPLETION		6-13-89	
TYPE/SIZE OF SAND PACK		-		COMPLETION DEPTH (ft)		66.5	
SCREEN PERFORATION		-		ROCK DEPTH (ft)		-	
TYPE/THICKNESS OF SEAL(S)		-		DIAMETER OF BORING (in.)		8	
DIAMETER OF WELL (IN.)		-		Backfilled with dry mixture of Sand and Bentonite			
NO. OF SAMPLES		DIST. 0		UNDIST. 14		CORE 0	
WATER DEPTH (ft)		FIRST -		COMPL -		24 HRS -	
LOGGED BY				CHECKED BY			
P. Glaesman				M. Rozmajec			
H. Reyes							

DEPTH (ft.)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No.	Type	Flow Count	O.V.A. (ppm)				
							Head	Space			Back-Ground
0	8-inch Asphalt concrete										
1	Very soft, moist, dark yellowish brown to dark gray, CLAY (CH).			1	X	15	60	20		1142	
2	Becomes mottled with iron oxide stains and black stains of decomposed roots.			2	X	23	80	20		1149	
3	Hard, moist, dark yellowish brown, SILTY CLAY (CL).			3	X	32	90	20		1155	
4				4	X	39	90	20		1202	
5	Hard, moist, dark yellowish brown, SANDY SILT (ML).			5	X	24	110	20		1209	
6				6	X	17	120	20		1215	
7	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).			7	X	27	1000+	20		1224	Strong chemical odor
8				8	X	24	1000+	20		1231	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE		LOG OF BORING		B-7		Fig B-4	
Project No.: 8941863J							

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No	Type	Unit	O.V.A. (ppm)				
							Head -	Space -			Back - Ground
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).										
40	Hard, moist, dark yellowish brown, SILTY CLAY (CL), (SILTY CLAYSTONE?), micaceous, with iron oxide spotting and hairlike root holes			9	X	32	1000+	20	1240		
45	Becomes olive color.			10	X	24	1000+	20	1251		
50	Medium dense, moist, mottled with olive gray and yellowish brown, SILTY fine grained SAND (SM), with trace of clay and iron oxide staining.			11	X	20	1000+	20	1304		
55	Becomes medium grained with abundant shell fragments, strong HCL reaction.			12	X	36	1000+	20	1316		
60	Very stiff to hard, moist, olive brown, SANDY SILT (ML), (SILTSTONE?).			13	X	28	1000+	20	1329		
65	Medium dense, moist, olive gray, SILTY fine grained SAND (SM-ML), very micaceous.			14	X	27			1342		
	Bottom of Boring at 66.5 feet.										
70											
75											
Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 8941863J				CONT. LOG OF BORING B-5							
				WOODWARD-CLYDE CONSULTANTS							

BORING LOCATION		See Location Map		ELEVATION AND DATUM		Approximately 51 Feet above MSL									
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Romero		DATE STARTED		6-14-89		DATE FINISHED		6-14-89	
DRILLING EQUIPMENT		CME 75 with 8-inch O.D., H.S.A.		COMPLETION DEPTH (ft)		66.5		ROCK DEPTH (ft)		-					
TYPE OF WELL CASING		-		SCREEN PERFORATION		-		DIAMETER OF BORING (in.)		8		DIAMETER OF WELL (IN)		-	
TYPE, SIZE OF SAND PACK		-		TYPE, THICKNESS OF SEAL(S)		Backfilled with Dry Mixture of Sand and Bentonite									
No. OF SAMPLES		DIST. 0		UNDIST. 14		CORE 0		LOGGED BY				CHECKED BY			
WATER DEPTH (ft)		FIRST -		COMPL -		24 HRS. -		P. Gliesman H. Reyes				M. Razmajoo			

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No	Type	Blow Count	Head - Space	Back - Ground			
	6-inch Asphalt concrete over 6-inch base material.			1	X	16	18	12		0745	
	Very stiff, moist, very dark brown, SANDY CLAY (CL), with root holes.			2	X	43	47	12		0758	
5	Becomes hard.			3	X	58	42	12		0806	
	Dense, moist, yellowish brown, CLAYEY fine grained SAND (SC).			4	X	11	45	12		0815	
10	Hard, moist, dark brown, SILTY CLAY (CL), with root holes.			5	X	21	20	12		0820	
	Medium stiff, moist, olive brown, SANDY SILT (ML).			6	X	15	42	12		0826	
15	Very stiff, moist, dark brown, SILTY CLAY (CL) with hairlike root holes.			7	X	26	58	12		0833	
20	Very stiff, moist, dark brown, SILTY CLAY (CL) with hairlike root holes.			8	X	86	68	12		0841	
25	Very stiff to hard, moist, dark olive brown, SILTY CLAY (CL), with calcareous nodules and hairlike root holes.										
30	Very dense, moist, dark olive brown, SILTY fine grained SAND (SM), with large calcareous nodules.										
35											

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING

B-8
Fig B-6

WOODWARD-CLYDE CONSULTANTS

DEPTH(feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate(Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space			Back - Ground
	Very dense, moist, dark olive brown, SILTY fine grained SAND (SM), with large calcareous nodules.										
	3 Lens of hard, moist, dark olive brown, silty clay.										
40	Silty sand becomes very moist, olive in color.			9	X	39	125		12	0848	
	Very stiff to hard, moist, olive, SANDY CLAY (CL), with iron oxide stains and calcareous nodules. (Strong HCL Reaction)										
45				10	X	29	230		12	0857	
	Medium dense, moist, olive gray and yellowish-brown mottled, SILTY fine grained SAND (SM) (SP), with iron oxide staining, micaceous.										
50				11	X	24	1000+		12	0912	
	Becomes dense, medium grained with abundant iron oxide, calcareous nodules, and shell fragments cemented.										
55				12	X	35	1000+		12	0925	
	Very dense, moist, yellowish brown, medium grained SAND (SP).										
60				13	X	85	1000+		12	0934	
	Hard, moist, olive, SANDY SILT (ML), (SILTSTONE?), micaceous.										
	Dense, moist, yellowish brown, medium grained SAND (SP).										
65	Dense, moist, olive, SILTY fine grained SAND (SM).			14	X	35	1000+		12	0952	
	Bottom of Boring at 66.5 feet.										
70											
75											
Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 8941863J		CONT. LOG OF BORING B-3									Fig B-7
WOODWARD-CLYDE CONSULTANTS											

BORING LOCATION		See Location Map		ELEVATION AND DATUM		Approximately 51 Feet above MSL									
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Romero		DATE STARTED		6-14-89		DATE FINISHED		6-14-89	
DRILLING EQUIPMENT		CME 75 with 8-inch O.D., H.S.A.		COMPLETION DEPTH (ft)		66.5		ROCK DEPTH (ft)		-		DIAMETER OF BORING (in.)		8	
TYPE OF WELL CASING		-		SCREEN PERFORATION		-		DIAMETER OF WELL (IN)		-		LOGGED BY		P. Glasman	
TYPE SIZE OF SAND PACK		-		TYPE THICKNESS OF SEAL(S)		-		CHECKED BY		M. Razmajoo		Backfilled with dry mixture of Sand and Bentonite			
No. OF SAMPLES		DIST		0		UNDIST.		14		CORE		0		H. Reyes	
WATER DEPTH (ft)		FIRST		-		COMPL		-		24 HRS		-			

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head	Space	Back-Ground		
	6-inch Asphalt concrete over 9-inch base material.										
	Medium stiff, saturated, dark brown, SILTY CLAY (CL).			1	X	6	100	19		1107	
5	Becomes very stiff.			2	X	21	100	19		1112	
10	Becomes hard.			3	X	47	100	20		1120	
15	Becomes more silty, very stiff.			4	X	26	100	20		1124	
20	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).			5	X	30	100	20		1130	
25	Stiff to very stiff, moist, olive brown, SANDY SILT (ML), micaceous.			6	X	16	130	20		1137	
30	Very stiff, moist, dark olive brown, SILTY CLAY (CL), with iron oxide spotting and root holes.			7	X	25	130	20		1145	
35	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).			8	X	21	125	20		1153	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING

B-8

Fig.
B-8

WOODWARD-CLYDE CONSULTANTS

DEPTH(feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate(Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head-Space	Back-Ground			
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).										
40	Hard, moist, dark olive brown, SILTY CLAY (CL), micaceous.			9	X	68	120	20	1202		
45	↓ Becomes very stiff, olive, with iron oxide spotting and decomposed roots.			10	X	25	130	20	1211		
50	Dense, moist, mottled, olive gray and yellowish brown, SILTY fine grained SAND to SAND (SW-SP), with iron oxide staining.			11	X	45	340	20	1224		
55	↓ Becomes less silty, grades to dense, moist, yellowish brown, fine to medium grained SAND (SP), micaceous.			12	X	42	900	20	1235		Moderate Chemical odor.
60	Dense, damp to moist, olive gray, SILTY fine grained SAND (SM), very micaceous.			13	X	46	490	20	1250		
65	Hard, moist, olive, SANDY SILT (ML), (SILTSTONE?), micaceous.			14	X	30	1000+	20	1303		
	Bottom of Boring at 66.5 feet.										
70											
75											
Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 8941863J				CONT. LOG OF BORING B-9						Fig. B-9	

LOCATION WCC-1		ELEVATION AND DATUM Top of Casing 50.70 Feet	
DRILLING AGENCY Detum Exploration, Inc.		DRILLER James	
DRILLING EQUIPMENT Mobile Drill B-61, 10-inch O.D., H.S.A.		STARTED 3-25-67 FINISHED 3-26-67	
DIAMETER AND TYPE OF WELL CASING 2-inch Plastic, Flush Threaded		DEPTH (FT) 91	
TYPE OF PERFORATION .02 Slot		NO. OF SAMPLES 5	
TYPE OF BACKFILL No. 12 Silica Sand		WATER DEPTH (FT) 74.5	
TYPE OF SEAL Bentonite Pellet Plug and Bentonite Grout		LOGGED BY S. Donaldson	
		CHECKED BY B. Jacobs	

DEPTH (FEET)	DESCRIPTION	Lithology	Observations from Well	SAMPLES				REMARKS
				No.	Type	Blow Count	Drilling Time	
0	Asphalt						0006	Background OVA reading = 1-2 ppm
0	Damp, reddish-brown, SILTY SAND (SP) with clay and gravel. Becomes black							
5	Becomes reddish brown, no gravel.							
10	Becomes medium brown.							
12	CLAYEY SAND (SC).						0015	
15								
20								
25	Stiff, damp, medium brown, CLAYEY SILT (ML) with some fine sand.							
30	Becomes hard with more clay.						0020	
35	Lense of volcanic (?) angular gravel.							

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 41863B	LOG OF BORING WCC-1S	Fig. B-10
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LA/OR-0783-235R

WOODWARD-CLYDE CONSULTANTS

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG			SAMPLES					REMARKS
		Lithology	Observations	Non Water	DVA (sec)	No.	Type	Blow Count	Drilling Feet/ Turn	
	Lense of volcanic (?) angular gravel (continued).									
40									0930	
	↓ Becomes moist and hard.									
45						1	⊗	59		
	Very hard, moist, dark brown, SILTY CLAY (CL).									
50										
	Lenses of very hard, carbonate cemented concretions.					1	⊗	26		
55									1010	
	Increasing silt.									
60										
	Medium dense, dry, tan, fine SAND (SP).					7.5	⊗	57		
65										
	Dense, dry, whitish-tan, fine SAND (SP).									
70						2.5	⊗	50/ 5"		
	↓ Becomes damp and very dense.									
	Very stiff, damp, dark brown SILT (ML).									
75						7.8	⊗	50/ 5"		
	↓ Becomes wet.									
	Very dense, wet, brown, fine SAND (SP).									Water encountered at 74.5 feet.

Project: DOUGLAS AIRCRAFT
COMPANY TORRANCE
Project No.: 418638

CONT. LOG OF BORING WCC-1S

Fig.
B-11

LA/OR-0783-238R

WOODWARD - CLYDE CONSULTANTS

BOE-C6-0092214

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG		SAMPLES				REMARKS
		Liabilities	Observation Well	NOVA (ft)	No.	Type	Blow Count	
	Very stiff, wet, dark brown SILT (ML) (continued).							
80	Very dense, wet, brown, fine SAND (SP).				12	X	6	
85								
90	Stiff, moist, dark brown, SILTY CLAY (CL).							
	Bottom of Boring at 91 feet.							
95								
100								
105								
110								
115								

Project: DOUGLAS AIRCRAFT
 Project No.: COMPANY TORRANCE 41863B

CONT. LOG OF BORING WCC-1S

Fig. B-12

LA/OR-0783-236R

WOODWARD - CLYDE CONSULTANTS


BORING LOCATION		WCC-2 See Figure 2		ELEVATION AND DATUM		Top of casing @ 50.59 ft.	
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Smith	
DRILLING EQUIPMENT		CME 75, 10-inch H.S.A.		DATE STARTED		10-28-87	
TYPE OF WELL CASING		4" Sch. 40 PVC		COMPLETION DEPTH (ft.)		90.6	
No. OF SAMPLES		DIST. -		SCREEN PERFORATION		.010 Slot	
WATER DEPTH (ft.)		FIRST 73		UNDIST. 5		CORE -	
		COMPL. -		24 HRS. 71.1		LOGGED BY	
						H. Reyes	
						CHECKED BY	
						B. Jacobs	

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION				Drilling Rate (Time)	REMARKS
			No.	Type	Blow Count	O.V.A. (ppm)		
0	Asphalt						1306	Background OVA reading = 5 ppm
5	Medium stiff, very moist, dark yellowish brown, SANDY CLAY (CL). Becomes very dark grayish brown.						1308	
10	Color change to yellowish brown. Becomes stiffer less moisture, SANDY CLAY (CL).						1317	
15	Continued SANDY CLAY (CL). Less stiff, more moist.						1319	
20	Grades to SILTY CLAY (CL). Medium stiff, very moist, olive brown, SILTY CLAY.						1323	
25							1327	
30							1333	
35								

Project: DOUGLAS AIRCRAFT COMPANY	LOG OF BORING WCC-2S	Fig. B-13
Project No.: 8741863D		

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (f.)	REMARKS
(continued)	Stiff, moist, olive brown, SILTY CLAY (CL).							
40								
	Dense, moist, olive brown, fine grained, SILTY SAND (SM), with shells.							
45			1	X	34	5	1342	
50							1357	
55			2	X	60	5	1402	
	Very dense, damp, strong brown, fine grained SAND (SP) to SILTY SAND (SM), iron oxide staining.							
60							1423	
	Becomes SILTY SAND.							
65	Dense, moist, olive, fine grained SILTY SAND (SM), some iron oxide stains.		3	X	42	6	1433	
70							1500	
	Becomes wet.							▽ Water at 73 feet.
75	Very dense, wet, olive brown, fine grained, SILTY SAND (SM).		4	X	68	6	1512	
80							1544	
Project: DOUGLAS AIRCRAFT COMPANY		CONT. LOG OF BORING WCC-2S						Fig.
Project No.: 8741863D								B-14
WOODWARD-CLYDE CONSULTANTS								

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (F.)	REMARKS
85	(continued) Very dense, wet, olive, fine grained to very fine grained SILTY SAND (SM), micaceous, with some clay interbedding and iron oxide staining.		5	X	50/ 3"	5	1600	
90	Bottom of Boring at 90.5 feet.							Note: 48 gallons of city water used to offset hydro- static head of flowing sands during well installation.
95								
100								
105								
110								
115								
120								
125								
Project: DOUGLAS AIRCRAFT COMPANY Project No.: 8741863D			CONT. LOG OF BORING WCC-2S					Fig. B-15

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION		WCC-3 See Figure 2		ELEVATION AND DATUM		Top of Casing @ 51.19 ft.	
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Smith	
DRILLING EQUIPMENT		CME 75, 10-inch H.S.A.		DATE STARTED		10-26-87	
TYPE OF WELL CASING		4" Sch. 40 PVC		COMPLETION DEPTH (ft.)		92	
No. OF SAMPLES		DIST. -		SCREEN PERFORATION		.010 Slot	
WATER DEPTH (ft)		FIRST 73.5		UNDIST. 6		CORE -	
		COMPL -		24 HRS. 74.0		LOGGED BY	
						H. Reyes	
						CHECKED BY	
						B. Jacobs	

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION				Drilling Rate (Time)	REMARKS
			No.	Type	Blow Count	O.V.A. (ppm)		
0	Asphalt						0846	Background OVA reading = 4-6 ppm
5	Damp, very dark grayish brown, fine grained SILTY SAND (SM) with small gravel. Soft, very moist, dark gray to black SILTY CLAY (CL). Becomes less moist, dark yellowish brown, stiff.							
10	Continued SILTY CLAY (CL). Becomes more stiff, no detectable odor.							
15							0855	
20	Dense, moist, yellowish brown, CLAYEY SAND to SANDY CLAY (SC-CL).							
25	Grades to SILTY CLAY (CL). Stiff, moist, dark yellowish brown SILTY CLAY.						0857	No odor.
30							0905	No odor.
35	Lens of volcanic ash.						0913	

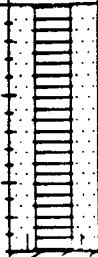

Project: DOUGLAS AIRCRAFT COMPANY
 Project No.: 8741863D

LOG OF BORING WCC-3S

Fig.
B-16

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (f.)	REMARKS
(continued)	Stiff, moist, olive brown, SILTY CLAY (CL).							
40							0921	
45	Lens of stiff, moist, olive, SANDY SILT (ML), micaceous with decomposed pieces of roots.		1	X	25	30	0924	Earthy odor.
50							0937	
55	Clay becomes more stiff, interbedded with lenses of dense, moist, yellowish brown, medium grained SILTY SAND (SM) with shells, partially cemented and crystalized calcite.		2	X	30	570	0945	Moderate chemical odor.
60							1005	Easier drilling.
65	Dense, moist, yellowish brown to olive gray, very fine grained SILTY SAND to SAND (SM-SP), micaceous.		3	X	46	440	1015	Moderate to strong chemical odor. Very easy drilling.
70	Very stiff, very moist, olive brown, SANDY SILT (ML), micaceous with iron oxide stains.		4	X	35	+1000	1035	Strong chemical odor.
75	Becomes wet. Very dense, wet, olive brown fine grained SAND (SP) to SILTY SAND (SM).		5	X	59	+1000	1047	Strong chemical odor.
80	Becomes medium grained.		6	X	N.R.	+1000	1112	
Project: DOUGLAS AIRCRAFT COMPANY		CONT. LOG OF BORING WCC-3S						Fig. B-17
Project No.: 8741863D								WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (f./min.)	REMARKS
85	(continued) Very dense, saturated, olive brown, fine to medium grained SAND (SP-SM) with some silt.						1205	Moderate to strong chemical odor.
90							1545	
95	Bottom of Boring at 92.0 feet.							Note: Used 59 gallons of city water to offset hydrostatic head of flowing sands during well installation.
100								
105								
110								
115								
120								
125								
Project: DOUGLAS AIRCRAFT COMPANY Project No.: 8741863D			CONT. LOG OF BORING WCC-3S					Fig. B-18

WOODWARD-CLYDE CONSULTANTS

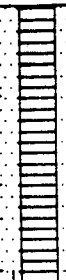

BORING LOCATION		WCC-4 See Figure 2		ELEVATION AND DATUM		Top of casing @ 49.69 ft.	
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Smith	
DRILLING EQUIPMENT		CME 75, 10-inch H.S.A.		DATE STARTED		10-27-87	
TYPE OF WELL CASING		4" Sch. 40 PVC		COMPLETION DEPTH (ft)		91.5	
No. OF SAMPLES		DIST. -		SCREEN PERFORATION		.010 Slot	
WATER DEPTH (ft)		FIRST 75		UNDIST. 8		CORE -	
		COMPL. -		24 HRS. 71.6		LOGGED BY	
						H. Reyes	
						CHECKED BY	
						B. Jacobs	

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION				Drilling Rate (Time)	REMARKS
			No.	Type	Blow Count	O.V.A. (ppm)		
0	Asphalt						1230	Background OVA reading = 4-6 ppm
5	Moist, grayish brown, SILTY CLAY with some SAND (CL).							No odor.
5	Moist, dark yellowish brown, SILTY CLAY (CL).							
10								
15								
20								
25								
30								
35								
	Lense of dark greenish black volcanic(?) angular gravel.							

Project: DOUGLAS AIRCRAFT COMPANY	LOG OF BORING WCC-4S	Fig. B-19
Project No.: 8741863D		

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
40								
45	Very stiff, organic roots and plant detritus with orangish iron oxide staining.		1	X	18	8	1345	No odor.
50								
55			2	X	23	8	1350	No odor.
60	Occasional fossiliferous gravel.							
65			3	X	43	5	1425	No odor.
70	Hard, light olive brown, fine SANDY SILT to SILTY fine SAND (SM).							
75	Becomes wet. Hard, damp, light olive brown, SILTY CLAY (CL) with iron oxide staining.		4	X	42	7		Water at 75 feet.
80	Very dense, light olive brown, fine grained SAND (SP) with little silt. 2 inch layer of CLAY (CL).		5	X	45	8	1530	No odor.
<div>Project: DOUGLAS AIRCRAFT COMPANY</div> <div>Project No.: 8741863D</div> <div>CONT. LOG OF BORING WCC-4S</div> <div>Fig. B-20</div> <div>WOODWARD-CLYDE CONSULTANTS</div>								

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (f.)	REMARKS
85	(continued) Very dense, wet, light olive brown, fine grained SAND (SP) with little silt.							
90	Moist, light olive brown, SILTY CLAY (ML-CL).		6	X	N.R.	8	1700	No odor.
	Bottom of Boring at 91.5 feet.							Note: 45 gallons of city water used to offset hydro- static head of flowing sands during well instal- lation.
95								
100								
105								
110								
115								
120								
125								
Project: DOUGLAS AIRCRAFT COMPANY			CONT. LOG OF BORING WCC-4S					Fig.
Project No.: 8741863D								B-21

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION		WCC-5		ELEVATION AND DATUM		48.22 Feet above MSL	
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		TEXT	
DRILLING EQUIPMENT		CME 75, 10 - inch H.S.A.		DATE STARTED		11-24-87	
TYPE OF WELL CASING		4" PVC, SCH. 40		SCREEN PERFORATION		Lone Star #0130	
No. OF SAMPLES		DIST. -		UNDIST. 4		CORE -	
WATER DEPTH (ft)		FIRST 73		COMPL 70		24 HRS-70.3 1/2	
				LOGGED BY		B. Jacobs	
				CHECKED BY		H. Reyes	

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION				Drilling Rate (Time)	REMARKS
			No.	Type	Blow Count	O.V.A. (ppm)		
5	Moist, dark olive brown, CLAYEY SILT (CL-ML) with little sand.						1400	Background OVA reading = 3-4 ppm
10	Moist, moderate brown, SILTY CLAY (CL), with some sand.							
15	Becomes more Silty.							
20								
25	Becomes dark yellowish brown.							
30								
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863D

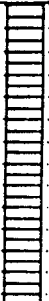
LOG OF BORING WCC-5S

Fig.
B-22

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (f.)	REMARKS
40	Moist, dark yellowish brown, SILTY CLAY (CL). (continued) with some organic roots and iron oxide staining.						1445	
45			1	X	34	3		No odor.
50	Dense, moist, dusky yellow to light olive brown, fine grained, SAND (SP) with little silt.							
55	Interbeds of Silty Sands and Clay.		2	X	37	5	1515	No odor.
60								
65	Becomes very dense.		3	X	70	4	1550	No odor.
70								
75	Becomes wet. Dense, wet, moderate olive brown, fine grained, SILTY SAND (SM-ML).		4	X	35	3		Water at 73 feet. No odor.
80								

Project: DOUGLAS AIRCRAFT COMPANY	CONT. LOG OF BORING	WCC-5S	Fig.
Project No.: 8741863D			B-23/24

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
85	Dense, wet, moderate olive brown, fine grained SILTY SAND (SM-ML).							No sample collected Augers sanding-in.
90								
	Bottom of Boring at 91 feet.							Note: 55 gallons of city water was used to aid well install- ation.
95								
100								
105								
110								
115								
120								
125								
Project: DOUGLAS AIRCRAFT COMPANY Project No.: 8741863D			CONT. LOG OF BORING WCC-5S					Fig. B-25

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map		ELEVATION AND DATUM	50.95 Feet above MSL	
DRILLING AGENCY	Gregg Drilling and Testing, Inc.		DRILLER	C. Swenson	
DRILLING EQUIPMENT	Mobile B-61 with 11-inch O.D. H.S.A.		DATE STARTED	9-21-89	DATE FINISHED 9-22-89
TYPE OF WELL	PVC Sen. 40	SCREEN PERFORATION	0.010 inch	COMPLETION DEPTH (ft)	91.0
TYPE SIZE OF SAND PACK	Monterey #0/30	TYPE THICKNESS OF SEALS	1/4" Bentonite Pellets	ROCK DEPTH (ft)	-
No OF SAMPLES	DIST. 0	UNDIST. 1	CORE 0	DIAMETER OF BORING (in.)	11
WATER DEPTH (ft)	FIRST -	COMPL -	24 HRS -	DIAMETER OF WELL (IN)	4
			LOGGED BY	H. Reyes	
			CHECKED BY	M. Pazmajoo	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES							Drilling Rate (Time)	REMARKS
				No	Type	Blow Count	Head	Space	Back	Ground		
	4-inch Asphalt concrete over 6-inch base material.										1315	
	Moist, dark yellowish brown, SANDY CLAY (CL).											
	Becomes dark brown.											
5	Becomes hard, dark yellowish brown			1	X	49	16		16		1326	
10												
	Becomes SILTY CLAY (CL).											
15	Very stiff to hard, moist, olive brown, CLAYEY SILT (MH), micaceous.			2	X	33	16		16		1339	
20												
25				3	X	40	16		16		1345	
30	Very stiff, moist, olive brown, SILTY CLAY (CL).											
	Layer of hard, dry, olive gray sandstone											
35	Very stiff to hard, olive brown, SANDY SILT (ML), micaceous.			4	X							

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

LOG OF BORING WCC-68 Fig B-26

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)				Drilling Rate (Time)
							Head-Space	Back-Ground			
(continued)	Very stiff to hard, moist, olive brown, SANDY SILT (ML), micaceous.			4	X	49	19	15	1350		
40											
	Very dense, moist, olive gray, SILTY fine grained SAND (SM), micaceous.										
45				5	X	63	16	16	1422		
	Some clay.										
	Layer of cemented shell fragments.										
50											
	Very stiff to hard, very moist, olive brown, SANDY SILT (ML), very micaceous, iron oxide stains.										
55				6	X	47	18	16	1432		
60											
	Very dense, moist, olive brown, SILTY fine grained SAND (SM), very micaceous.										
65				7	X	89	19	16	1443		
70											
75	Becomes saturated, medium grained SAND to SILTY SAND (SP-SM), with strong odor. Lense of sandy silt.			8	X	166	1000+	16	1505	Strong odor	

Project: DOUGLAS AIRCRAFT CO.	CONT. LOG OF BORING W006S	Fig B-27
Project No.: 8941863J		

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

CONT. LOG OF BORING W006S Fig B-27

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space	Back - Ground		
(continued)	Very dense, saturated, olive to olive gray, SILTY fine grained SAND (SM), with some odor.										
80				9	X	185	720		16	1520	Odor
85				10	X	170	25		8	1555	
90				11	X	91	46		8	1612	
Bottom of Boring at 91 feet.											
95											
100											
105											
110											
115											

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

CONT. LOG OF BORING WCC-63

Fig. B-28

BORING LOCATION		See Location Map		ELEVATION AND DATUM		48.29 feet MSL	
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Romero	
DRILLING EQUIPMENT		CME 75 with 10-inch O.D. H.S.A.		DATE STARTED		6-8-89	
TYPE OF WELL CASING		PVC Sch. 40		DATE FINISHED		6-8-89	
TYPE/SIZE OF SAND PACK		Lonestar No. 0/30		COMPLETION DEPTH (ft)		90.5	
SCREEN PERFORATION		0.01-inch		ROCK DEPTH (ft)		-	
TYPE/THICKNESS OF SEAL(S)		Bentonite Pellets 5 ft./Volclay grout 49.0 ft.		DIAMETER OF BORING (in.)		10	
No. OF SAMPLES		DIST. 1		UNDIST. 0		CORE 0	
WATER DEPTH (ft)		FIRST -		COMPL. -		24 HRS. -	
				LOGGED BY		P. Glaesman	
				CHECKED BY		M. Razmajoo	
				H. Reyes			

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES				Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)			
	6-inch Asphalt concrete, over 8-inch base material.									
	Hard, moist, black, SANDY CLAY (CL). Becomes dark yellowish brown.			1	X	31	1	10	0913	
5				2	X	45	1	10	0940	
10				3	X	36	1	10	0951	
	Medim dense, moist, olive brown, SILTY fine grained SAND (SM).									
15				4	X	14	3	10	1002	
	Becomes dark yellowish brown, with trace of clay, some decomposed roots.									
20				5	X	25	2	10	1009	
	Hard, moist, dark olive brown, fine grained SANDY CLAY (CL), with root holes.									
25				6	X	31	2	10	1017	
	Dense, moist, olive brown, SILTY fine grained SAND (SM).									
30				7	X	41	2	10	1058	
	With root holes and small nodules of calcium carbonate (HCL Reaction).									
35				8	X	32	2	10	1105	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE	LOG OF BORING WCC-75	Fig B-29
Project No.: 8941863J		

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head-Space	Back-Ground			
	Dense, moist, olive brown, SILTY fine grained SAND (SM), with root holes and CaCo ₃ nodules.										
40	Medium dense, moist, dark brown to olive brown, medium grained SAND (SP).			9	X	25	3	10	1112		
45	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).			10	X	44	2	12	1123		
	Zone of hard, damp, light brown, calcareous material (sand and shell fragments)										
50	Very stiff, moist, olive, CLAY (CL), mixed with shell fragments and calcareous nodules (appears to be gouge zone).			11	X	19	3	10	1134		
	Dense, moist, olive, SILTY fine grained SAND (SM).										
55	Hard, moist, olive, SANDY CLAY (CL), with some iron oxide staining.			12	X	35	2	10	1148		
	Dense, moist, olive brown, SILTY fine grained SAND to SAND (SM-SP).										
60	Dense, moist, olive gray, fine grained SAND (SP).			13	X	38	1	10	1201		
65				14	X	43	1	10	1214		
70	Dense, very moist, olive, SILTY fine grained SAND (SM), micaceous.			15	X	44	3	10	1228		
	Becomes saturated.										
75				16	X	44	9	10	1300		
Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 8941863J											
CONT. LOG OF BORING WCC-7S											
Fig. B-30											

Fig.
B-30

WOODWARD-CLYDE CONSULTANTS

DEPTH(feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES				Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)			
80	Dense, saturated, olive, silty fine grained sand. SM. micaceous			17	X	55	13	9	1355	Added 15 pounds of tap water to prevent sticking. Sand comes in the auger.
	Sand becomes fine to medium grained.									
85	Becomes very dense, medium grained, with few coarse grains, less silt, few shell fragments.			18	X	69	1	9	1355	
	Becomes dense, medium to coarse grained, more silt, no shell fragments.			19	X	57			1415	
90	Bottom of Spring at 90.5 feet. Upon completion of drilling and sampling added approximately 60 gallons of tap water to prevent heaving sand coming inside the augers.								1641	
95										
100										
105										
110										
115										

Project: DOUGLAS AIRCRAFT TORRANCE COMPANY
Project No.: 8941863J

CONT. LOG OF BORING... B-31

WOODWARD-CLIDE

BORING LOCATION		See Location Map		ELEVATION AND DATUM		50.56 feet MSL	
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Romero	
DRILLING EQUIPMENT		CME 75 with 8 and 10-inch O.D., H.S.A.		DATE STARTED		6-12-89	
TYPE OF WELL CASING		Sch. 40 PVC		SCREEN PERFORATION		0.01-inch	
TYPE/SIZE OF SAND PACK		Lonestar No. 0/30		TYPE/THICKNESS OF SEAL(S)		Bentonite Pellets 5 ft./Void clay grout 49.5 ft.	
No. OF SAMPLES		DIST. 0		UNDIST. 17		CORE 0	
WATER DEPTH (ft)		FIRST -		COMPL -		24 HRS. -	
LOGGED BY		P. Glaesman		CHECKED BY		M. Rozma,oo	
H. Reyes							

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)					Drilling Rate (Time)
							Head -	Space -	Back -			
	8-inch Asphalt concrete.											
	Base material, medium dense, moist, yellowish brown, CLAYEY SAND (SC), decomposed granite.			1	X	12	0		11	0750		
5	Stiff, very moist, very dark gray, SANDY CLAY (CL).			2	X	55	13		11	0810		
	Hard, moist, dark yellowish brown, SANDY CLAY to CLAYEY fine grained SAND (CL-SC).											
10	Hard, moist, olive brown, SILTY CLAY (CL).			3	X	82	30		11	0819		
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).											
15	Very stiff to hard, moist, olive brown, SILTY CLAY (CL), with CaCo ₃ veinlets.			4	X	20	41		11	0823		
20				5	X	26	46		11	0830		
25	Dense, moist, olive, SILTY fine grained SAND (SM-ML), with some iron oxide staining and hairlike root holes.			6	X	33	24		11	0839		
30	Hard, moist, dark olive brown, SANDY CLAY (CL), with caliche veinlets.			7	X	32	21		11	0846		
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).											
35	Becomes more silty, grades to (SM).			8	X	31	43		10	0855		

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING WCC-88 Fig B-32

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head	Space	Back-Ground		
	Dense, moist, olive brown, SILTY fine grained SAND (SM).										
40	Stiff to very stiff, moist, olive brown, SANDY SILT (ML).			9	X	24	43	11	0904		
	Dense, moist, olive brown, SILTY fine grained SAND (SM), with abundant calcareous nodules.										
45	Hard, moist, olive, SILTY CLAY (CL), with iron oxide staining and calcareous nodules.			10	X	31	46	10	0917		
	Medium dense, moist to very moist, olive gray and yellowish brown, mottled, CLAYEY grained SAND (SC).										
50	Dense, moist, olive brown, SILTY fine grained SAND (SM), with abundant shell fragments which are cemented together forming coquina.			11	X	13	48	10	0925		
55				12	X	43	72	10	0938		
60	Very stiff to hard, moist, olive, SANDY SILT (ML), micaceous, with iron oxide staining.			13	X	26	70	10	0950		
	Very dense, moist, light olive brown, SILTY fine grained SAND (SM), micaceous.										
65				14	X	83	100	10	1003		
70	↓ Becomes very moist to saturated.			15	X	71	100	10	1015		
75	Hard, saturated, olive, SANDY SILT (ML), micaceous.			16	X	38	100	10	1028	Becomes wet at 75 feet.	
<div>Project: DOUGLAS AIRCRAFT COMPANY TORRANCE Project No.: 8941863J</div> <div>CONT. LOG OF BORING WCC-88</div> <div>Fig B-33</div>											

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)					
							Head -	Space	Back -			Ground
30	Hard, saturated, olive, SANDY SILT (ML), micaceous.			17	X	21	32	10	1042		Unable to collect sample due to existence of 8 feet of heaving sand inside the auger. Added 5 gal. of water to prevent heaving sand coming into augers.	
85	Medium dense, saturated, light gray, SILTY fine to medium grained SAND (SM-SP).			18	X	NR	NR	10	1102			
90	Bottom of Boring at 90 feet.											
95	Notes: 1. Boring was initially drilled with 8-inch outside diameter and samples were taken. Upon completion of sampling, boring was enlarged with 10-inch outside diameter and well was installed. 2. Added 40 gallons of water prior to installation of well casing.											
100												
105												
110												
115												

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-8S

Fig. B-34

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-8S

Fig.
B-34

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map			ELEVATION AND DATUM	47.01 Feet above MSL			
DRILLING AGENCY	Gregg Drilling and Testing, Inc.		DRILLER	C. Swenson	DATE STARTED	9-20-89	DATE FINISHED	9-21-89
DRILLING EQUIPMENT	Mobile B-61 with 11-inch, O.D., S.A.				COMPLETION DEPTH (ft)	91.5	ROCK DEPTH (ft)	-
TYPE OF WELL CASING	PVC Sch. 40		SCREEN PERFORATION	0.010 inch	DIAMETER OF BORING (in.)	11	DIAMETER OF WELL (IN.)	4
TYPE SIZE OF SAND PACK	Monterey #0/30		TYPE THICKNESS OF SEALS	(1/4") Bentonite Pellets 3 1/2" x 3 1/2", Grout 5' 5"				
No. OF SAMPLES	DIST	-	UNDIST.	3	CORE	-	LOGGED BY	CHECKED BY
WATER DEPTH (ft)	FIRST	-	COMPL.	-	24 HRS	-	H. Reyes	M. Ramirez

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES							Drilling Rate (Time)	REMARKS	
				No.	Type	Flow Count	O.V.A. (ppm)						
							Head	Space	Back	Ground			
	4-inch Asphalt concrete over 6-inch base material.											1036	
5	Very stiff to hard, moist, dark yellowish brown, SILTY CLAY (CL), with fine grained sand, micaceous.			1	X	45	8		6			1043	
10				2	X	31	-		6			1051	
15	Stiff, moist, dark yellowish brown, CLAYEY SILT (MH), micaceous.			3	X	15	7		6			1058	
20	Becomes very stiff to hard.			4	X	34	7		6			1102	
25	Very stiff to hard, moist, dark brown to olive brown, SILTY CLAY (CL).			5	X	43	6.6		6			1110	
30	Very dense, moist, olive brown, SILTY fine grained SAND (SM), with some clay veinlets.			6	X	80	6.9		6			1117	
35	Very stiff to hard, moist, dark olive brown, CLAYEY SILT (MH).			7	X	9	6		6			1125	

Project: DOUGLAS AIRCRAFT CO.
Project No.: 8941863J

LOG OF BORING WCC-95 Fig
B-35

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No	Type	Blow Count	O. V. A. (ppm)				
							Head -	Space -	Back -	Ground -	
	Continued) Very stiff to hard, moist, dark olive brown, SILTY CLAY (MH).			7	X	60				1124	
40	Hard, moist, dark olive brown, SILTY CLAY (CL), with stringers of black mineral particles?			8	X	48	6.8	6	6	1132	
45	Contains abundant shell fragments.			9	X	65	6.5	6	6	1140	
50	Very dense, damp, light yellowish brown to olive brown, SILTY fine to medium grained SAND (SM).			10	X	89	8.7	6	6	1151	
55	Very stiff to hard, moist to very moist, olive, SILTY CLAY (CL), with iron oxide staining.			11	X	36	6.7	6	6	1158	
60	Lens of dense, damp, yellowish brown, fine grained SAND (SP).			12	X	91	6.5	6	6	1208	
65	Very dense, very moist, dark brown, SILTY fine grained SAND (SM), micaceous.			13	X	89	6	6	6	1214	
70	Hard, saturated, olive, SANDY SILT (ML), micaceous.			14	X	83	6	6	6	1222	
75	Medium dense, saturated, olive brown, medium grained SAND (SP-SM), micaceous.			15	X	26	6	6	6	1255	

Project: DOUGLAS AIRCRAFT CO.
Project No.: 3941863J

CONT. LOG OF BORING NO. 100-100
B-36

WOODWARD-CORRELL CORPORATION

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space	Back -		
	(Continued) Medium dense to very dense, saturated, olive brown, fine to medium grained SAND (SP-SM), micaceous.										
80				16	X	100	6.5	5.5	1317		
85				17	X	90	6.2	5.5	1340		
90	Hard, saturated, olive, SANDY SILT (ML).			18	X	75	5.5	5.5	1358		
	Bottom of Boring at 91.5 feet.										
95											
100											
105											
110											
115											

Project: DOUGLAS AIRCRAFT COMPANY Project No.: 8941863J	CONT. LOG OF BORING WCC-9S	Fig. B-37
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BORING LOCATION				See Location Map		ELEVATION AND DATUM		51.12 feet MSL									
DRILLING AGENCY		A & R Drilling, Inc.		DRILLER		M. Romero		DATE STARTED 6-7-89		DATE FINISHED 6-7-89							
DRILLING EQUIPMENT				CME 75 with 8-inch O.D., H.S.A.				COMPLETION DEPTH (ft)		90.8		ROCK DEPTH (ft)		-			
TYPE OF WELL CASING		PVC Sch. 40		SCREEN PERFORATION		0.01-inch		DIAMETER OF BORING (in.)		10		DIAMETER OF WELL (IN.)		4			
TYPE/SIZE OF SAND PACK				Lonestar No. 0/30				TYPE/THICKNESS OF SEAL(S)		Bentonite Pellets 5 ft./Voidclay grout 49 ft							
No. OF SAMPLES		DIST.		0		UNDIST.		18		CORE		0		LOGGED BY		P. Glaesman	
WATER DEPTH (ft)		FIRST		-		COMPL		-		24 HRS		-		CHECKED BY		M. Razma	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	Head - Space	Back - Ground	O.V.A. (ppm)		
	3 1/2-inch Asphalt concrete, over 9-inch base material.										
	Soft, very moist to saturated, black, SANDY CLAY (CL). Becomes very stiff, moist, dark yellowish brown.										
5				1	X	24	1	7		0954	
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM), with trace of clay.										
10				2	X	13	1	7		1007	
	No clay.										
15				3	X	25	2	7		1013	
20				4	X	21	0	6		1017	
	Very stiff to hard, moist, dark yellowish brown, SANDY CLAY (CL).										
25				5	X	61	0	6		1024	
	Contains large nodules of calcium carbonate (HCL Reaction).										
30				6	X	36	1	6		1031	
	Dense, moist, olive brown, SILTY fine grained SAND (SM).										
35				7	X	32	2	6		1038	
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING WCC-105
Fig B-38

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES					Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space -			Back - Ground
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).										
	Dense to very dense, damp, pale brown, fine grained SAND (SP)										
40				8	X	46	1	6	1045		
45				9	X	55	2	6	1054		
50	Becomes olive brown.			10	X	43	2	6	1106		
55	Dense, moist, olive brown, GRAVELLY medium grained SAND (SW), gravel 1/4"-1/2" diameter.			11	X	32	1	4	1115		
60	Very dense, moist, dark olive, CLAYEY fine grained SAND (SC).			12	X	90	1	4	1136		
	Very dense, moist, olive, SILTY fine grained SAND (SM).										
65				13	X	74	3	4	1141		
70	Becomes wet, olive brown.			14	X	51	NR	4	1203		
75				15	X	125	10	4	1215		

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-10S Fig B-39

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O. V. A. (ppm)					
							Head -	Space -	Back -			Ground -
80	Very dense, saturated, olive brown, SILTY fine grained SAND (SM). Becomes olive, micaceous.			16	X	104	6		4	1250		
85	Becomes medium grained with shell fragments.			17	X	42	6		4	1305	Added 25 gal. water to prevent surging, sand coming inside the augers	
90	Bottom of Boring at 90.8 feet.			18	X	30 3"	6		3	NR		
95												
100	Note: Added 40 gallons of water prior to installation of well casing.											
105												
110												
115												

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-105
Fig 3-40

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WOO-105
Fig 3-40

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION		See Location Map		ELEVATION AND DATUM		50.45 Feet MSL	
DRILLING AGENCY		Beylik Drilling, Inc.		DRILLER		D. Jones	
DRILLING EQUIPMENT		Ingersal Rand, MUD Rotary		DATE STARTED		6-28-89	
TYPE OF WELL CASING		PVC Sch. 40		DATE FINISHED		6-30-89	
TYPE/SIZE OF SAND PACK		Lonestar No. 0/30		COMPLETION DEPTH (ft)		140	
No. OF SAMPLES		DIST. 4		SCREEN PERFORATION		0.01 inch	
WATER DEPTH (ft)		FIRST		DIAMETER OF BORING (in.)		10	
		COMPL		TYPE/THICKNESS OF SEAL(S)		Bentonite Pellets 5 ft./Voidclay grout 107 ft.	
		24 HRS.		LOGGED BY		H. Reyes	
				P. Glaesman		CHECKED BY	
						M. Razmdjoo	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)				
				Head	Space	Back	Ground				
0	6-inch Asphalt concrete over 6-inch base material.									1235	
5	Dark yellowish brown, CLAYEY fine grained SAND (SC), with small diameter gravel.									1303	
10	Dark yellowish brown, SILTY CLAY (CL), with fine grained sand.									1308	
15											
20											
25										1313	Stopped drilling to repair drill rig.
30										1400	Resumed drilling.
35	Dark yellowish brown, SILTY fine grained SAND (SM).										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8840863J

LOG OF BORING WCC-10 Fig B-41

WOODWARD-CLYDE CONSULTANTS

DEPTH(feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate(Time)	REMARKS
				No	Type	Blow Count	O.V.A. (ppm)				
							Head -	Space	Back - Ground		
(continued)	Dark yellowish brown, SILTY fine grained SAND (SM).										
40										1416	
45	Dark yellowish brown, SILTY CLAY (CL).										
50	Dark yellowish brown, SILTY fine grained SAND (SM).									1427	Loosing a lot of drilling MUD.
55	Olive brown, medium grained SAND (SP-SM), with small gravel and shell fragments.										
60										1500	
65	Dark yellowish brown, SILTY CLAY (CL), micaceous.										
70	Yellowish brown, fine grained SAND (SP-SM), with small diam. gravel and shell fragments.									1517	
75	Becomes olive brown.										
Project: DOUGLAS AIRCRAFT COMPANY TORRANCE		CONT. LOG OF BORING WCC-10									Fig.
Project No.: 8941863J											B-42
WOODWARD-CLYDE CONSULTANTS											

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No	Type	Blow Count	O. V. A. (ppm)				
							Head -	Space	Back -		
	(continued) Olive brown, fine grained SAND (SP-SM), with shell fragments.										
80										1521	
85	Becomes medium grained.										Drilling mud. Loss reduced.
90										1527	
95	Abundant shell fragments.										
100										1530	
105											
110	Bluish gray and light yellowish brown, SILTY CLAY (CL).									1535	
115	Olive brown, fine to medium grained SAND (SP-SM).										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE	CONT. LOG OF BORING WCC-10	Fig B-43
Project No.: 8941863J		

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No	Type	Blow Count	O.V.A. (ppm)				
							Head	Space	Back-Ground		
	Olive brown, fine to medium grained SAND (SP-SM).										
120	Hard, olive, SILT (ML), micaceous (SILTSTONE?).									1604	
	Olive brown, medium grained SAND (SP).										50% Core Recovery,
	Moist, olive, SILT (ML), micaceous.			1							
125	Olive, SILTY fine grained SAND (SM).									1615	
	Dark yellowish brown, medium grained SAND (SP).			2							60% Core Recovery,
130										1644	
				3							20% Core Recovery
135										1701	
	Dark yellowish brown, and bluish gray, SILTY CLAY (CL).			4							20% Core Recovery
140	Bottom of Boring at 140 feet.									1725	
145	Initial drilling and sampling was completed on 28 June 1989. Boring was enlarged and well was constructed on 29 and 30 June 1989.										
150											
155											

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-10

Fig
B-44

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION		See Location Map		ELEVATION AND DATUM		51.18 feet MSL	
DRILLING AGENCY		Beylik Drilling, Inc.		DRILLER		D. Jones	
DRILLING EQUIPMENT		Ingersal Rand, Mud Rotary		DATE STARTED		6-23-89	
TYPE OF WELL CASING		PVC Sch. 40		SCREEN PERFORATION		0.01 inch	
TYPE/SIZE OF SAND PACK		Lonestar # 0/30		TYPE/THICKNESS OF SEAL(S)		Bentonite Pellets 5 ft./Voidclay grout 106 ft.	
No. OF SAMPLES		DIST. 4		UNDIST. 0		CORE 0	
WATER DEPTH (ft)		FIRST		COMPL		24 HRS	
				LOGGED BY		H. Reyes	
						P. Glaesman	
				CHECKED BY		M. Razmajoo	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS	
				No.	Type	Blow Count	O.V.A. (ppm)					
							Head	Space	Back-Ground			
5	5-inch asphalt concrete cover. 6-inch Base material. Dark yellowish brown, SILTY fine grained SAND (SM).										1326	
10	With some clay.										1347	
15												
20											1352	
25	Becomes olive brown, fine to medium SILTY grained SAND (SM).											
30	Becomes clayey with some calcareous nodules.										1358	
35												

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE		LOG OF BORING WCC-30	Fig B-45
Project No.: 8941863J			

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES						Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O. V. A. (ppm)				
							Head -	Space	Back - Ground		
(continued)	Olive brown, SILTY fine to medium grained SAND (SM), with trace of clay, some calcareous nodules.										
40										1415	Stopped drilling on 6-23-89 to repair drilling.
	Olive brown, SILTY CLAY (CL), with coarse grained sand.									1322	Resumed drilling on 6-26-89
45											
50										1329	
	Olive brown, SILTY fine grained SAND (SM), with some coarse grained sand and abundant shell fragments.										
55											
60										1402	
65											
70	More coarse grained sand.									1409	
	Olive brown, medium grained SAND (SP).										
75											
Project: DOUGLAS AIRCRAFT COMPANY TORRANCE											
Project No.: 8941863J											
CONT. LOG OF BORING WCC-3D											
Fig. B-46											

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES							Drilling Rate (Time)	REMARKS
				No.	Type	Blow Count	O.V.A. (ppm)					
							Head -	Space -	Back -	Ground		
(continued)	Olive brown, fine to medium grained SAND (SP), with abundant shell fragments.											
80											14'5	
	Lens of dark yellowish brown, coarse grained SAND (SP), slight chemical odor drilling mud foamed up.											
85												
90											1421	
	Lens of dark yellowish brown coarse grained SAND (SP).											
95												
100											1428	
	Becomes grayish brown.											
105												
110	Dark yellowish brown, SILTY CLAY (CL).										1436	
115												

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORINGWCC-30

Fig B-47

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-30 Fig. B-47

WOODWARD-CLYDE CONSULTANTS

DEPTH(feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES				Drilling Rate(Time)	REMARKS	
				No	Type	Blow Count	O V A (ppm)			
							Head - Space	Back - Ground		
138	Dark yellowish brown, silty clay (CU)									
140	Fine brown silty fine grained SAND (SM)									40% core recovered
142	Fine brown, sandy silt (ML), micaceous									
144	Fine brown, silty fine to medium grained SAND (SM)									
146	Fine brown clay (CH)									
148	Fine brown, medium grained SAND (SP)									
150	Med. reddish brown, SANDSTONE									
152	Med. int. yellowish brown to bluish grey, silty CLAYSTONE									
154	Initial drilling and sampling was completed on 23 and 26 June 1989. Boring was enlarged and well was constructed on 27 June 1989.									

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No: 89418630

CONT. LOG OF BORING WOODWARD-GRICE CONSULTANTS
B-48

WOODWARD-GRICE CONSULTANTS

APPENDIX C
ANALYTICAL RESULTS

(2L-ABC/C6GW3-AA)

June 28, 1989

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 12944

WCAS

**WEST COAST
ANALYTICAL
SERVICE, INC.**

QUALITY ASSURANCE

A

LABORATORY REPORT

Samples Received: Fifty-five (55) soils
Date Received: 6-13-89
Date Released for Analysis: 6-20-89
Purchase Order No: Proj#: 8941863J-Task 1/Douglas Aircraft Co.

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Thirteen (13) soils	Halogenated and Aromatic Volatile Organics by EPA 8010/8020	Data Sheets

Page 1 of 1

Shelley Stuart
Shelley Stuart
Senior Chemist

D.J. Northington
for D.J. Northington, Ph.D.
Technical Director

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 25-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-6-3-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.005
Bromomethane	ND	0.005
Vinyl Chloride	ND	0.003
Chloroethane	ND	0.005
Methylene Chloride	0.053	0.025
1,1-Dichloroethylene	ND	0.003
1,1-Dichloroethane	0.011	0.002
trans-1,2-Dichloroethylene	ND	0.002
Trichlorofluoromethane	ND	0.002
Chloroform	ND	0.002
1,2-Dichloroethane	ND	0.002
1,1,1-Trichloroethane	0.016	0.002
Carbon Tetrachloride	ND	0.002
Bromodichloromethane	ND	0.002
1,1,2,2-Tetrachloroethane	ND	0.002
1,2-Dichloropropane	ND	0.002
trans-1,3-Dichloropropylene	ND	0.002
Trichloroethylene	ND	0.002
Dibromochloromethane	ND	0.002
1,1,2-Trichloroethane	ND	0.002
Benzene	ND	0.001
cis-1,3-Dichloropropylene	ND	0.002
2-Chloroethyl Vinyl Ether	ND	0.004
Bromoform	ND	0.003
Tetrachloroethylene	ND	0.002
Toluene	0.064	0.001
Chlorobenzene	ND	0.004
Ethylbenzene	0.001	0.001
Total Xylenes	0.009	0.001
1,3-Dichlorobenzene	ND	0.001
1,4-Dichlorobenzene	ND	0.001
1,2-Dichlorobenzene	ND	0.001

ND-Not Detected. The limit of detection is reported above.

WEAS

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 23-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-6-5-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 500

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	2.5
Bromomethane	ND	2.5
Vinyl Chloride	ND	1.5
Chloroethane	ND	2.5
Methylene Chloride	ND	13
1,1-Dichloroethylene	ND	1.5
1,1-Dichloroethane	ND	1
trans-1,2-Dichloroethylene	ND	0.8
Trichlorofluoromethane	ND	1
Chloroform	ND	0.8
1,2-Dichloroethane	ND	1
1,1,1-Trichloroethane	12	0.8
Carbon Tetrachloride	ND	0.8
Bromodichloromethane	ND	0.8
1,1,2,2-Tetrachloroethane	ND	0.8
1,2-Dichloropropane	ND	0.8
trans-1,3-Dichloropropylene	ND	0.8
Trichloroethylene	45	0.8
Dibromochloromethane	ND	0.8
1,1,2-Trichloroethane	ND	0.8
Benzene	ND	0.5
cis-1,3-Dichloropropylene	ND	0.8
2-Chloroethyl Vinyl Ether	ND	2
Bromoform	ND	1.3
Tetrachloroethylene	ND	0.8
Toluene	1900	0.5
Chlorobenzene	ND	1.6
Ethylbenzene	51	0.5
Total Xylenes	390	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

ND-Not Detected. The limit of detection is reported above.

W&S

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date
Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-7-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 5000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	25
Bromomethane	ND	25
Vinyl Chloride	ND	15
Chloroethane	ND	25
Methylene Chloride	ND	125
1,1-Dichloroethylene	ND	15
1,1-Dichloroethane	ND	10
trans-1,2-Dichloroethylene	ND	7.5
Trichlorofluoromethane	ND	10
Chloroform	ND	7.5
1,2-Dichloroethane	ND	10
1,1,1-Trichloroethane	ND	7.5
Carbon Tetrachloride	ND	7.5
Bromodichloromethane	ND	7.5
1,1,2,2-Tetrachloroethane	ND	7.5
1,2-Dichloropropane	ND	7.5
trans-1,3-Dichloropropylene	ND	7.5
Trichloroethylene	ND	7.5
Dibromochloromethane	ND	7.5
1,1,2-Trichloroethane	ND	7.5
Benzene	ND	5
cis-1,3-Dichloropropylene	ND	7.5
2-Chloroethyl Vinyl Ether	ND	20
Bromoform	ND	12.5
Tetrachloroethylene	ND	7.5
Toluene	48	5
Chlorobenzene	ND	25
Ethylbenzene	ND	5
Total Xylenes	21	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 23-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-6-7-4
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	ND	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	19	1
Chlorobenzene	ND	5
Ethylbenzene	ND	1
Total Xylenes	6	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WALS

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 23-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-6-9-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	5
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	59	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	23	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	320	1
Chlorobenzene	ND	5
Ethylbenzene	2.9	1
Total Xylenes	21	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WEL

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date
Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-11-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	0.06	0.03
1,1-Dichloroethane	0.09	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.53	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	0.035	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.31	0.01
Chlorobenzene	ND	0.04
Ethylbenzene	ND	0.01
Total Xylenes	0.03	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date
Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-13-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	7.7	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	9.9	1
Chlorobenzene	ND	4
Ethylbenzene	ND	1
Total Xylenes	2.9	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCA'S

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date
Analyzed: 25-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-7-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 40

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.2
Bromomethane	ND	0.2
Vinyl Chloride	ND	0.2
Chloroethane	ND	0.2
Methylene Chloride	ND	1
1,1-Dichloroethylene	ND	0.12
1,1-Dichloroethane	ND	0.08
trans-1,2-Dichloroethylene	ND	0.06
Trichlorofluoromethane	ND	0.08
Chloroform	ND	0.06
1,2-Dichloroethane	ND	0.08
1,1,1-Trichloroethane	0.15	0.06
Carbon Tetrachloride	ND	0.06
Bromodichloromethane	ND	0.06
1,1,2,2-Tetrachloroethane	ND	0.06
1,2-Dichloropropane	ND	0.06
trans-1,3-Dichloropropylene	ND	0.06
Trichloroethylene	0.09	0.06
Dibromochloromethane	ND	0.06
1,1,2-Trichloroethane	ND	0.06
Benzene	ND	0.04
cis-1,3-Dichloropropylene	ND	0.06
2-Chloroethyl Vinyl Ether	ND	0.2
Bromoform	ND	0.1
Tetrachloroethylene	ND	0.06
Toluene	1.7	0.04
Chlorobenzene	ND	0.33
Ethylbenzene	ND	0.04
Total Xylenes	0.09	0.04
1,3-Dichlorobenzene	ND	0.08
1,4-Dichlorobenzene	ND	0.08
1,2-Dichlorobenzene	ND	0.08

ND-Not Detected. The limit of detection is reported above.

WCL

Client: WOODWARD CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 25-June-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-7-8-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	ND	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	ND	1
Chlorobenzene	ND	5
Ethylbenzene	ND	1
Total Xylenes	1	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

W&S

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 25-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-7-9-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	10	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	40	1
Chlorobenzene	ND	1.1
Ethylbenzene	ND	1
Total Xylenes	1	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WEAS

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 25-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-7-9-4
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	12	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	25	1
Chlorobenzene	ND	8.3
Ethylbenzene	ND	1
Total Xylenes	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCA'S

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 25-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-7-11-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	57	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	880	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	4	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	41	1
Chlorobenzene	ND	8.3
Ethylbenzene	ND	1
Total Xylenes	1.7	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WEAS

Client: WOODWARD CLYDE CONSULTANTS
 Job No: 12944
 Date
 Analyzed: 26-JUNE-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-7-13-3
 Matrix: Soil
 Samp Amt: 1 gm
 Dil Fact: 50

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	250
Bromomethane	ND	250
Vinyl Chloride	ND	150
Chloroethane	ND	250
Methylene Chloride	20000	1250
1,1-Dichloroethylene	600	150
1,1-Dichloroethane	ND	100
trans-1,2-Dichloroethylene	ND	75
Trichlorofluoromethane	ND	100
Chloroform	ND	75
1,2-Dichloroethane	ND	100
1,1,1-Trichloroethane	59000	75
Carbon Tetrachloride	ND	75
Bromodichloromethane	ND	75
1,1,2,2-Tetrachloroethane	ND	75
1,2-Dichloropropane	ND	75
trans-1,3-Dichloropropylene	ND	75
Trichloroethylene	ND	75
Dibromochloromethane	ND	75
1,1,2-Trichloroethane	ND	75
Benzene	ND	50
cis-1,3-Dichloropropylene	ND	75
2-Chloroethyl Vinyl Ether	ND	200
Bromoform	ND	125
Tetrachloroethylene	140	75
Toluene	450	50
Chlorobenzene	ND	300
Ethylbenzene	ND	50
Total Xylenes	ND	50
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,2-Dichlorobenzene	ND	100

ND-Not Detected. The limit of detection is reported above.

WCL

Woodward-Clyde Consultants

SHIPMENT NO.: 4

CHAIN OF CUSTODY RECORD

PAGE 2 OF 3PROJECT NAME: DOUGLASS AIRCRAFT COMPANYDATE 6/13/89PROJECT NO.: 8941863 J- TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required *
		Material	Method		Temp	Chemical	
B-6-11-4	B-6	SOIL	MOD.	BRASS TUBES	ICE	NONE	CONTACT ALSTON
B-6-12-3			OLIF.				CALLENDER
B-6-12-4							(7H) 835 686
B-6-13-3							
B-6-13-4							
B-6-14-3							
B-6-14-4	↓						
B-7-1-3	B-7						
B-7-1-4							
B-7-2-3							
B-7-2-4							
B-7-3-3							
B-7-3-4							
B-7-4-3							
B-7-4-4							
B-7-5-3							
B-7-5-4							
B-7-6-3							
B-7-6-4	↓	↓	↓	↓	↓	↓	
B-7-7-3	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 55Sampler's Signature: [Signature]

Received By:

Signature

Name

Peter Glaesman
WCE
for delivery to WCAS

Received By:

Signature

Printed Name

Company

[Signature]
Bill Gray
A-1

Date

6/13/89

Time

4:45

Received By:

Signature

Printed Name

Company

Reason

[Signature]
Bill Gray
A-1

Received By:

Signature

Printed Name

Company

[Signature]
April Richards
WCAS
1012944

Date

6/13/89

Time

5:35

Relinquished By:

Signature

Printed Name

Company

Reason

Received By:

Signature

Printed Name

Company

Date

Time

Relinquished By:

Signature

Printed Name

Company

Reason

Received By:

Signature

Printed Name

Company

Date

Time

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA OR-0183-421

Woodward-Clyde Consultants

SHIPMENT NO.: 4

CHAIN OF CUSTODY RECORD

PAGE 1 OF 3PROJECT NAME: DOUGLAS AIRCRAFT COMPANYDATE 6/13/89PROJECT NO.: 8941863 J - TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
B-6-1-3	B-6	Soil	MDP. Calit.	BRASS TUBE	ICE	NONE	COMBAT - Alisha Calender
B-6-1-4							
B-6-2-3							
B-6-2-4							
B-6-3-3							
B-6-3-4							
B-6-4-3							
B-6-4-4							
B-6-5-3							
B-6-5-4							
B-6-6-3							
B-6-6-4							
B-6-7-3							
B-6-7-4							
B-6-8-4							
B-6-9-3							
B-6-9-4							
B-6-10-3							
B-6-10-4							
B-6-11-3							

Total Number of Samples Shipped: 55 Sampler's Signature: Peter Glosman

Relinquished By:

Signature: Peter GlosmanPrinted Name: Peter GlosmanCompany: Woodward Clyde ConsultantsReason: State delivery to WCAS

Received By:

Signature: Bill GaryPrinted Name: Bill GaryCompany: A-1

Date

6/13/89

Time

4:45

Relinquished By:

Signature: Bill GaryPrinted Name: Bill GaryCompany: A-1Reason:

Received By:

Signature: April RichardsPrinted Name: April RichardsCompany: WCAS

Date

6/13/89

Time

5:35

Relinquished By:

Signature: Printed Name: Company: Reason:

Received By:

Signature: Printed Name: Company:

Date

/ /

Time

Relinquished By:

Signature: Printed Name: Company: Reason:

Received By:

Signature: Printed Name: Company:

Date

/ /

Time

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 4PAGE 3 OF 3DATE 6/13/89PROJECT NAME: DOUGLAS AIRCRAFT COMPANYPROJECT NO.: PA1863J - TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
B-7-7-4	B-7	SOIL	MOD.	BRASS TUBS	KE	NONE	CONTACT: Alistair Cutter (714) 835-6886
B-7-8-3			CALIF.				
B-7-8-4							
B-7-9-3							
B-7-9-4							
B-7-10-3							
B-7-10-4							
B-7-11-3							
B-7-11-4							
B-7-12-3							
B-7-12-4							
B-7-13-3							
B-7-13-4							
B-7-14-3							
B-7-14-4							

Total Number of Samples Shipped: 55Sampler's Signature: [Signature]

Relinquished By:

Signature: [Signature]Printed Name: John GlassmanCompany: WCEReason: for delivery to WCE

Received By:

Signature: [Signature]Printed Name: Bill GrayCompany: A-1

Date

6/13/89

Time

9:45

Relinquished By:

Signature: [Signature]Printed Name: Bill GrayCompany: A-1

Reason:

Received By:

Signature: [Signature]Printed Name: April RichardsCompany: WCE12944

Date

6/13/89

Time

5:35

Relinquished By:

Signature:

Printed Name:

Company:

Reason:

Received By:

Signature:

Printed Name:

Company:

Date

/ /

Time

/ /

Relinquished By:

Signature:

Printed Name:

Company:

Reason:

Received By:

Signature:

Printed Name:

Company:

Date

/ /

Time

/ /

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0183-421

RECEIVED

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WCC-SANTA

WCCS

**WEST COAST
ANALYTICAL
SERVICE, INC.**

ANALYTICAL CHEMISTS

A

June 30, 1989

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 12962

LABORATORY REPORT

Samples Received: Fifty-six (56) soils
Date Received: 6-15-89
Date Released for Analysis: 6-20-89
Purchase Order No: Proj#: 8941863J/Task 1-Douglas Aircraft

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Eight (8) soils	Halogenated and Aromatic Volatile Organics by EPA 8010/8020	Data Sheets

Page 1 of 1

Shelley Stuart
Shelley Stuart
Senior Chemist

D.J. Northington
D.J. Northington, Ph.D.
Technical Director

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date
Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-10-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	ND	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.27	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date
Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-11-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	ND	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.04	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date
Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-12-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.12	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.06	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCA'S

Client: WOODWARD-CLYDE CONSULTANTS
 Job No: 12962
 Date
 Analyzed: 28-Jun-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-8-13-3
 Matrix: Soil
 Samp Amt: 0.1 gm
 Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	0.04	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.44	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	1.0	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCA'S

Client: WOODWARD CLYDE CONSULTANTS
 Job No: 12962
 Date
 Analyzed: 28-JUNE-89
 Analysis: EPA 601/602 (8010/8020)

Sample: B-8-14-3
 Matrix: Soil
 Samp Amt: 0.1 gm
 Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.05	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	25	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCA'S

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date
Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-9-9-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	0.03	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.02	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	0.08	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.1	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCLAS

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date
Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-9-11-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	ND	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	0.02	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.11	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCL'S

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date
Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-9-12-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.03	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.06	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WGAS

Woodward-Clyde Consultants



SHIPMENT NO.: 5

CHAIN OF CUSTODY RECORD

PAGE 1 OF 3

DATE 6/14/89

PROJECT NAME: DOUGLAS AIRCRAFT CO.

PROJECT NO.: 8941863 J - TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
B-8-1-3	B-8	SOIL	MO.	BRASS TUBE	ICE	NONE	CONTACT:
B-8-1-4			OLIF.				Alistair Collier
B-8-2-3							(714) 835-6886
B-8-2-4							
B-8-3-3							
B-8-3-4							
B-8-4-3							
B-8-4-4							
B-8-5-3							
B-8-5-4							
B-8-6-3							
B-8-6-4							
B-8-7-3							
B-8-7-4							
B-8-8-3							
B-8-8-4							
B-8-9-3							
B-8-9-4							
B-8-10-3	✓	✓	✓	✓	✓	✓	
B-8-10-4	✓	✓	✓	✓	✓	✓	

Total Number of Samples Shipped: 56 Sampler's Signature: Peter Glaser

Relinquished By:
Signature: Peter Glaser
Printed Name: Peter Glaser
Company: WCC
Reason: for delivery to WCAS

Received By:
Signature: Larry P. Sipes
Printed Name: Larry P. Sipes
Company: A-1

Date
6/15/89

Time
9:50

Relinquished By:
Signature: Larry P. Sipes
Printed Name: Larry P. Sipes
Company: A-1
Reason: _____

Received By:
Signature: April Richards
Printed Name: _____
Company: WCAS 012962

Date
6/15/89

Time
12:30

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date
/ /

Time

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date
/ /

Time

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 5PAGE 2 OF 3DATE 6/14/89PROJECT NAME: DOUGLAS AIRCRAFT CO.PROJECT NO.: 8941863J-TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
B-8-11-3	B-8	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
B-8-11-4			COLIF.				Alstair
B-8-12-3							Callender
B-8-12-4							(714) 835-686
B-8-13-3							
B-8-13-4							
B-8-14-3							
B-8-14-4	V						
B-9-1-3	B-9						
B-9-1-4							
B-9-2-3							
B-9-2-4							
B-9-3-3							
B-9-3-4							
B-9-4-3							
B-9-4-4							
B-9-5-3							
B-9-5-4							
B-9-6-3	V	V	V	V	V	V	
B-9-6-4	V	V	V	V	V	V	

Total Number of Samples Shipped: 56 Sampler's Signature: [Signature]

Relinquished By:
Signature [Signature]
Printed Name Peter G. [unclear]
Company WCC
Reason for delivery to WCAS

Received By:
Signature [Signature]
Printed Name Larry P. [unclear]
Company A-1

Date
6/15/89Time
9:50

Relinquished By:
Signature [Signature]
Printed Name Larry P. [unclear]
Company A-1
Reason

Received By:
Signature [Signature]
Printed Name April Richards
Company WCAS #12962

Date
6/15/89Time
12:30pm

Relinquished By:
Signature
Printed Name
Company
Reason

Received By:
Signature
Printed Name
Company

Date
/ /

Time

Relinquished By:
Signature
Printed Name
Company
Reason

Received By:
Signature
Printed Name
Company

Date
/ /

Time

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0183-421

5

3 OF 3

6 141 89

DOUGLAS AIRCRAFT CO.

8941863 J-TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required *
		Material	Method		Temp	Chemical	
B-9-7-3	B-9	SOIL	MOD	BRASS TUBE	ICE	NONE	CONTACT: Alistair Callender (714) 835-6886
B-9-7-4			CALIF.				
B-9-8-3							
B-9-8-4							
B-9-9-3							
B-9-9-4							
B-9-10-3							
B-9-10-4							
B-9-11-3							
B-9-11-4							
B-9-12-3							
B-9-12-4							
B-9-13-3							
B-9-13-4							
B-9-14-3							
B-9-14-4							

Total Number of Samples Shipped: 56	Sampler's Signature:
-------------------------------------	----------------------

Relinquished By: Peter Glaesman
Signature _____
Printed Name Peter Glaesman
Company WCC
Reason for delivery to WCCAS

Received By: Larry P. Pipes
Signature Larry P. Pipes
Printed Name Larry P. Pipes
Company A-1

Date
6/15/89

Time
9:50

Relinquished By: _____
Signature Larry P. Lipner
Printed Name Larry P. Lipner
Company A-1
Reason _____

Received By: April Richards
Signature
Printed Name
Company WCRS No 12962

Date
10/15/89

Time
12:30 pm

Relinquished By: _____
Signature _____
Printed Name _____
Company _____
Reason _____

Received By:
Signature _____
Printed Name _____
Company _____

Date
/ /

Time

Relinquished By: _____
Signature _____
Printed Name _____
Company _____
Reason _____

Received By: _____
Signature _____
Printed Name _____
Company _____

Date	/ /
Time	

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0183-421

BOE-C6-0092280

July 27, 1989

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 13191

WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.

A

LABORATORY REPORT

Samples Received: Nine (9) liquids in quadruplicate and one (1)
liquid in duplicate

Date Received: 7-13-89


Date Released for Analysis: 7-17-89


Purchase Order No: Proj#: 8941863J-Task 1/Douglas Aircraft

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Fifteen (15) liquids	Volatile Organics by EPA 624	Data Sheets

Page 1 of 1


Michael Shelton
Senior Chemist


B. Michael Hovanec
Senior Staff Chemist

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: D.I.-A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/24/89
DATE ANALYZED: 07/24/89

RUN NUMBER: 13191V1
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: D.I.-A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====	=====	=====
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V10
SAMPLE AMOUNT: 250UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	100.
71-43-2	BENZENE	ND	20.
75-27-4	BROMODICHLOROMETHANE	ND	20.
75-25-2	BROMOFORM	ND	20.
74-83-9	BROMOMETHANE	ND	100.
78-93-3	2-BUTANONE (MEK)	ND	100.
75-15-0	CARBON DISULFIDE	ND	20.
56-23-5	CARBON TETRACHLORIDE	ND	20.
108-90-7	CHLOROBENZENE	ND	20.
75-00-3	CHLOROETHANE	ND	100.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	200.
67-66-3	CHLOROFORM	ND	20.
74-87-3	CHLOROMETHANE	ND	100.
108-41-8	CHLOROTOLUENE	ND	20.
124-48-1	DIBROMOCHLOROMETHANE	ND	20.
95-50-1	1,2-DICHLOROBENZENE	ND	20.
541-73-1	1,3-DICHLOROBENZENE	ND	20.
106-46-7	1,4-DICHLOROBENZENE	ND	20.
75-34-3	1,1-DICHLOROETHANE	ND	20.
107-06-2	1,2-DICHLOROETHANE	ND	20.
75-35-4	1,1-DICHLOROETHYLENE	900.	20.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	20.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	20.
78-87-5	1,2-DICHLOROPROPANE	ND	20.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	20.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	20.
100-41-4	ETHYLBENZENE	ND	20.
106-93-4	ETHYLENE DIBROMIDE	ND	20.
76-13-1	FREON-TF	ND	20.
119-78-6	2-HEXANONE	ND	100.
75-09-2	METHYLENE CHLORIDE	ND	100.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	100.
100-42-5	STYRENE	ND	20.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	20.
127-18-4	TETRACHLOROETHYLENE	ND	20.
109-99-9	TETRAHYDROFURAN	ND	100.
108-88-3	TOLUENE	ND	20.
71-55-6	1,1,1-TRICHLOROETHANE	67.	20.
79-00-5	1,1,2-TRICHLOROETHANE	ND	20.
79-01-6	TRICHLOROETHYLENE	2400.	20.
75-69-4	TRICHLOROFLUOROMETHANE	ND	20.
108-05-4	VINYL ACETATE	ND	100.
75-01-4	VINYL CHLORIDE	ND	100.
95-47-6	TOTAL XYLENES	ND	20.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1R

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V13
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1R

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-2S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/20/89
DATE ANALYZED: 07/20/89

RUN NUMBER: 13191V1
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	5.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-2S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-3S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V50
SAMPLE AMOUNT: 10UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	3000.
71-43-2	BENZENE	ND	500.
75-27-4	BROMODICHLOROMETHANE	ND	500.
75-25-2	BROMOFORM	ND	500.
74-83-9	BROMOMETHANE	ND	3000.
78-93-3	2-BUTANONE (MEK)	ND	3000.
75-15-0	CARBON DISULFIDE	ND	500.
56-23-5	CARBON TETRACHLORIDE	ND	500.
108-90-7	CHLOROBENZENE	ND	500.
75-00-3	CHLOROETHANE	ND	3000.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	5000.
67-66-3	CHLOROFORM	ND	500.
74-87-3	CHLOROMETHANE	ND	3000.
108-41-8	CHLOROTOLUENE	ND	500.
124-48-1	DIBROMOCHLOROMETHANE	ND	500.
95-50-1	1,2-DICHLOROBENZENE	ND	500.
541-73-1	1,3-DICHLOROBENZENE	ND	500.
106-46-7	1,4-DICHLOROBENZENE	ND	500.
75-34-3	1,1-DICHLOROETHANE	ND	500.
107-06-2	1,2-DICHLOROETHANE	ND	500.
75-35-4	1,1-DICHLOROETHYLENE	18000.	500.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	500.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	660.	500.
78-87-5	1,2-DICHLOROPROPANE	ND	500.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	500.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	500.
100-41-4	ETHYLBENZENE	ND	500.
106-93-4	ETHYLENE DIBROMIDE	ND	500.
76-13-1	FREON-TF	ND	500.
119-78-6	2-HEXANONE	ND	3000.
75-09-2	METHYLENE CHLORIDE	ND	3000.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	3000.
100-42-5	STYRENE	ND	500.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	500.
127-18-4	TETRACHLOROETHYLENE	ND	500.
109-99-9	TETRAHYDROFURAN	ND	3000.
108-88-3	TOLUENE	32000.	500.
71-55-6	1,1,1-TRICHLOROETHANE	56000.	500.
79-00-5	1,1,2-TRICHLOROETHANE	550.	500.
79-01-6	TRICHLOROETHYLENE	7700.	500.
75-69-4	TRICHLOROFLUOROMETHANE	ND	500.
108-05-4	VINYL ACETATE	ND	3000.
75-01-4	VINYL CHLORIDE	ND	3000.
95-47-6	TOTAL XYLENES	ND	500.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-3S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WALS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-4S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V60
SAMPLE AMOUNT: 2ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	20.
71-43-2	BENZENE	ND	3.
75-27-4	BROMODICHLOROMETHANE	ND	3.
75-25-2	BROMOFORM	ND	3.
74-83-9	BROMOMETHANE	ND	20.
78-93-3	2-BUTANONE (MEK)	ND	20.
75-15-0	CARBON DISULFIDE	ND	3.
56-23-5	CARBON TETRACHLORIDE	ND	3.
108-90-7	CHLOROBENZENE	ND	3.
75-00-3	CHLOROETHANE	ND	20.
110-75-8	2-CHLOROETHYL VINYLETHER	ND	30.
67-66-3	CHLOROFORM	ND	3.
74-87-3	CHLOROMETHANE	ND	20.
108-41-8	CHLOROTOLUENE	ND	3.
124-48-1	DIBROMOCHLOROMETHANE	ND	3.
95-50-1	1,2-DICHLOROBENZENE	ND	3.
541-73-1	1,3-DICHLOROBENZENE	ND	3.
106-46-7	1,4-DICHLOROBENZENE	ND	3.
75-34-3	1,1-DICHLOROETHANE	ND	3.
107-06-2	1,2-DICHLOROETHANE	ND	3.
75-35-4	1,1-DICHLOROETHYLENE	170.	3.
156-59-4	CIS-1,2-DICHLOROETHYLENE	10.	3.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	3.
78-87-5	1,2-DICHLOROPROPANE	ND	3.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	3.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	3.
100-41-4	ETHYLBENZENE	ND	3.
106-93-4	ETHYLENE DIBROMIDE	ND	3.
76-13-1	FREON-TF	ND	3.
119-78-6	2-HEXANONE	ND	20.
75-09-2	METHYLENE CHLORIDE	ND	20.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	20.
100-42-5	STYRENE	ND	3.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	3.
127-18-4	TETRACHLOROETHYLENE	ND	3.
109-99-9	TETRAHYDROFURAN	ND	20.
108-88-3	TOLUENE	ND	3.
71-55-6	1,1,1-TRICHLOROETHANE	11.	3.
79-00-5	1,1,2-TRICHLOROETHANE	ND	3.
79-01-6	TRICHLOROETHYLENE	270.	3.
75-69-4	TRICHLOROFLUOROMETHANE	ND	3.
108-05-4	VINYL ACETATE	ND	20.
75-01-4	VINYL CHLORIDE	ND	20.
95-47-6	TOTAL XYLENES	ND	3.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-4S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V51
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	3.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	6.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	13.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1B

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V52
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	3.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	6.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	12.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1B

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-7S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V61
SAMPLE AMOUNT: 500UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	50.
71-43-2	BENZENE	ND	10.
75-27-4	BROMODICHLOROMETHANE	ND	10.
75-25-2	BROMOFORM	ND	10.
74-83-9	BROMOMETHANE	ND	50.
78-93-3	2-BUTANONE (MEK)	ND	50.
75-15-0	CARBON DISULFIDE	ND	10.
56-23-5	CARBON TETRACHLORIDE	ND	10.
108-90-7	CHLOROBENZENE	ND	10.
75-00-3	CHLOROETHANE	ND	50.
110-75-8	2-CHLOROETHYL VINYLETHER	ND	100.
67-66-3	CHLOROFORM	ND	10.
74-87-3	CHLOROMETHANE	ND	50.
108-41-8	CHLOROTOLUENE	ND	10.
124-48-1	DIBROMOCHLOROMETHANE	ND	10.
95-50-1	1,2-DICHLOROBENZENE	ND	10.
541-73-1	1,3-DICHLOROBENZENE	ND	10.
106-46-7	1,4-DICHLOROBENZENE	ND	10.
75-34-3	1,1-DICHLOROETHANE	ND	10.
107-06-2	1,2-DICHLOROETHANE	ND	10.
75-35-4	1,1-DICHLOROETHYLENE	850.	10.
156-59-4	CIS-1,2-DICHLOROETHYLENE	26.	10.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	11.	10.
78-87-5	1,2-DICHLOROPROPANE	ND	10.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	10.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	10.
100-41-4	ETHYLBENZENE	ND	10.
106-93-4	ETHYLENE DIBROMIDE	ND	10.
76-13-1	FREON-TF	ND	10.
119-78-6	2-HEXANONE	ND	50.
75-09-2	METHYLENE CHLORIDE	ND	50.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	50.
100-42-5	STYRENE	ND	10.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	10.
127-18-4	TETRACHLOROETHYLENE	ND	10.
109-99-9	TETRAHYDROFURAN	ND	50.
108-88-3	TOLUENE	ND	10.
71-55-6	1,1,1-TRICHLOROETHANE	110.	10.
79-00-5	1,1,2-TRICHLOROETHANE	ND	10.
79-01-6	TRICHLOROETHYLENE	1300.	10.
75-69-4	TRICHLOROFLUOROMETHANE	ND	10.
108-05-4	VINYL ACETATE	ND	50.
75-01-4	VINYL CHLORIDE	ND	50.
95-47-6	TOTAL XYLENES	ND	10.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-7S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCCS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V58
SAMPLE AMOUNT: 1ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYL VINYLETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	430.	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	7.	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	9.	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	160.	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	240.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1R

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V54
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1R

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13193V4
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	3.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	2.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	86.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1B

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V5
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	3.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	1.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	87.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1B

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1R

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V6
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1R

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-11S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/26/89

RUN NUMBER: 13191V63
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-11S-1A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====	=====	=====
1 NONE FOUND	VOA	

WCAS

Data Reporting Qualifiers

- Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.
- ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.
- TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

WEAS

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 6
PAGE 1 OF 2
DATE 7/12/89

PROJECT NAME: Douglas Aircraft Co./C6
PROJECT NO.: 8941863 J-TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
WCC-1S-1A	WCC-1S	WATER	BALLER	40 ml VOA	ICE	NONE	CONTACT:
WCC-1S-1B				↓			ALISTARCA
WCC-1S-1C				4 oz glass			(714) 335-626
WCC-1S-1R				40 ml VOA			
WCC-2S-1A	WCC-2S			↓			
WCC-2S-1B				4 oz glass			
WCC-2S-1C				40 ml VOA			
WCC-2S-1R				↓			
WCC-3S-1A	WCC-3S			4 oz glass			
WCC-3S-1B				40 ml VOA			
WCC-3S-1C				↓			
WCC-3S-1R				4 oz glass			
WCC-4S-1A	WCC-4S			40 ml VOA			
WCC-4S-1B				↓			
WCC-4S-1C				4 oz glass			
WCC-4S-1R				40 ml VOA			
WCC-5S-1A	WCC-5S			↓			
WCC-5S-1B				4 oz glass			
WCC-5S-1C				40 ml VOA			
WCC-5S-1R				↓			

Total Number of Samples Shipped: 38 Sampler's Signature: [Signature]

Relinquished By:
Signature: [Signature]
Printed Name: Peter Glarsma
Company: WCC
Reason: for analysis by WCAS

Received By:
Signature: [Signature]
Printed Name: DAVID RAZICKI
Company: A-1

Date: 7/13/89
Time: 9:05

Relinquished By:
Signature: [Signature]
Printed Name: D. Razicki
Company: A-1
Reason: DELIVERED

Received By:
Signature: [Signature]
Printed Name: APRIL RICHARDS
Company: WCAS 113191

Date: 7/13/89
Time: 12:10

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date: 1/1
Time: _____

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date: 1/1
Time: _____

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA. OR-0183

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 6
PAGE 2 OF 2
DATE 7/12/89

PROJECT NAME: Douglas Aircraft Co./C6
PROJECT NO.: 89418631 - TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
WCC-75-1A	WCC-75	Water	BALLOON	40 ml VOA	ICE	None	WATER:
WCC-75-1B				↓			WATER (1.4) 335-5800
WCC-75-1C				4 oz glass			
WCC-75-1R	↓			40 ml VOA			
WCC-85-1A	WCC-85			↓			
WCC-85-1B				4 oz. glass			
WCC-85-1C	↓			40 ml VOA			
WCC-85-1R	↓			↓			
WCC-105-1A	WCC-105			4 oz. glass			
WCC-105-1B				40 ml VOA			
WCC-105-1C	↓			↓			
WCC-105-1R	↓			4 oz. glass			
WCC-115-1A	WCC-115			40 ml VOA			
WCC-115-1B				↓			
WCC-115-1C	↓			4 oz. glass			
WCC-115-1R	↓			40 ml VOA			
D.I.-A	Jug		525	↓			
D.I.-B	Jug		525	↓			

Total Number of Samples Shipped: 38 Sampler's Signature: Pete Glaser

Relinquished By:
Signature: Pete Glaser
Printed Name: Pete Glaser
Company: WCC
Reason: for analysis by WCAS

Received By:
Signature: David Rozicki
Printed Name: DAVID ROZICKI
Company: A-1

Date
7/13/89
Time
9:05

Relinquished By:
Signature: D. Rozicki
Printed Name: D. ROZICKI
Company: A-1
Reason: DELIVERED

Received By:
Signature: April Richards
Printed Name: APRIL RICHARDS
Company: WCAS 113191

Date
7/13/89
Time
12:12

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date
1/1
Time

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date
1/1
Time

Special Shipment / Handling / Storage Requirements:

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0187

August 9, 1989

RECEIVED

AUG 10 1989

WCC-SANTA ANA

WCAS

**WEST COAST
ANALYTICAL
SERVICE, INC.**

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 13290

A

LABORATORY REPORT

Samples Received: Twelve (12) waters
Date Received: 7-26-89
Date Released for Analysis: 8-7-89
Purchase Order No: Proj#: 8941863J/Task 1-Douglas Aircraft

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Two (2) waters	Volatile Organics by EPA 624	Data Sheets

Page 1 of 1



Michael Shelton
Senior Chemist



D.J. Northington, Ph.D.
Technical Director

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13290

SAMPLE: WCC-1D-1A

DATE RECEIVED: 07/26/89
DATE EXTRACTED: 08/08/89
DATE ANALYZED: 08/08/89

RUN NUMBER: 13290V1
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	5.	5.
108-88-3	TOLUENE	1.	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	2.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13290

SAMPLE: WCC-1D-1A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====	=====	=====
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13290

SAMPLE: WCC-3D-1A

DATE RECEIVED: 07/26/89
DATE EXTRACTED: 08/08/89
DATE ANALYZED: 08/08/89

RUN NUMBER: 13290V2
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	11.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	3.	1.
71-55-6	1,1,1-TRICHLOROETHANE	49.	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	4.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13290

SAMPLE: WCC-3D-1A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====	=====	=====
1 NONE FOUND	VOA	

WCAS

Data Reporting Qualifiers

- Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.
- ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.
- TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

WCAS

September 8, 1989

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Peter Glaesman

JOB NO. 13533

WCAS

**WEST COAST
ANALYTICAL
SERVICE, INC.**

ANALYTICAL CHEMISTS

A

LABORATORY REPORT

Samples Received: Fifty-five (55) liquids
Date Received: 8-24-89
Purchase Order No: Proj#: 8941863J Task 1/Douglas Aircraft

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Thirteen (13) liquids	Volatile Organics by EPA 624	Data Sheets

Page 1 of 1



Michael Shelton
Senior Chemist



B. Michael Hovanec
Senior Staff Chemist

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-1D-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V16
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	1.	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	2.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-1D-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-1S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V17
SAMPLE AMOUNT: 150UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	200.
71-43-2	BENZENE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	30.
75-25-2	BROMOFORM	ND	30.
74-83-9	BROMOMETHANE	ND	200.
78-93-3	2-BUTANONE (MEK)	ND	200.
75-15-0	CARBON DISULFIDE	ND	30.
56-23-5	CARBON TETRACHLORIDE	ND	30.
108-90-7	CHLOROBENZENE	ND	30.
75-00-3	CHLOROETHANE	ND	200.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	300.
67-66-3	CHLOROFORM	ND	30.
74-87-3	CHLOROMETHANE	ND	200.
108-41-8	CHLOROTOLUENE	ND	30.
124-48-1	DIBROMOCHLOROMETHANE	ND	30.
95-50-1	1,2-DICHLOROBENZENE	ND	30.
541-73-1	1,3-DICHLOROBENZENE	ND	30.
106-46-7	1,4-DICHLOROBENZENE	ND	30.
75-34-3	1,1-DICHLOROETHANE	ND	30.
107-06-2	1,2-DICHLOROETHANE	ND	30.
75-35-4	1,1-DICHLOROETHYLENE	1500.	30.
156-59-4	CIS-1,2-DICHLOROETHYLENE	41.	30.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	30.
78-87-5	1,2-DICHLOROPROPANE	ND	30.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	30.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	30.
100-41-4	ETHYLBENZENE	ND	30.
106-93-4	ETHYLENE DIBROMIDE	ND	30.
76-13-1	FREON-TF	ND	30.
119-78-6	2-HEXANONE	ND	200.
75-09-2	METHYLENE CHLORIDE	ND	200.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	200.
100-42-5	STYRENE	ND	30.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	30.
127-18-4	TETRACHLOROETHYLENE	ND	30.
109-99-9	TETRAHYDROFURAN	ND	200.
108-88-3	TOLUENE	ND	30.
71-55-6	1,1,1-TRICHLOROETHANE	ND	30.
79-00-5	1,1,2-TRICHLOROETHANE	ND	30.
79-01-6	TRICHLOROETHYLENE	2800.	30.
75-69-4	TRICHLOROFLUOROMETHANE	ND	30.
108-05-4	VINYL ACETATE	ND	200.
75-01-4	VINYL CHLORIDE	ND	200.
95-47-6	TOTAL XYLENES	ND	30.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-1S-2A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-2S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V18
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	3.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-2S-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====	=====	=====
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3D-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V19
SAMPLE AMOUNT: 500UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	50.
71-43-2	BENZENE	ND	10.
75-27-4	BROMODICHLOROMETHANE	ND	10.
75-25-2	BROMOFORM	ND	10.
74-83-9	BROMOMETHANE	ND	50.
78-93-3	2-BUTANONE (MEK)	ND	50.
75-15-0	CARBON DISULFIDE	ND	10.
56-23-5	CARBON TETRACHLORIDE	ND	10.
108-90-7	CHLOROBENZENE	ND	10.
75-00-3	CHLOROETHANE	ND	50.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	100.
67-66-3	CHLOROFORM	ND	10.
74-87-3	CHLOROMETHANE	ND	50.
108-41-8	CHLOROTOLUENE	ND	10.
124-48-1	DIBROMOCHLOROMETHANE	ND	10.
95-50-1	1,2-DICHLOROBENZENE	ND	10.
541-73-1	1,3-DICHLOROBENZENE	ND	10.
106-46-7	1,4-DICHLOROBENZENE	ND	10.
75-34-3	1,1-DICHLOROETHANE	ND	10.
107-06-2	1,2-DICHLOROETHANE	ND	10.
75-35-4	1,1-DICHLOROETHYLENE	ND	10.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	10.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	10.
78-87-5	1,2-DICHLOROPROPANE	ND	10.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	10.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	10.
100-41-4	ETHYLBENZENE	ND	10.
100-93-4	ETHYLENE DIBROMIDE	ND	10.
13-1	FREON-TF	ND	10.
119-78-6	2-HEXANONE	ND	50.
75-09-2	METHYLENE CHLORIDE	ND	50.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	50.
100-42-5	STYRENE	ND	10.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	10.
127-18-4	TETRACHLOROETHYLENE	ND	10.
109-99-9	TETRAHYDROFURAN	ND	50.
108-88-3	TOLUENE	ND	10.
71-55-6	1,1,1-TRICHLOROETHANE	32.	10.
79-00-5	1,1,2-TRICHLOROETHANE	ND	10.
79-01-6	TRICHLOROETHYLENE	ND	10.
75-69-4	TRICHLOROFLUOROMETHANE	ND	10.
108-05-4	VINYL ACETATE	ND	50.
75-01-4	VINYL CHLORIDE	ND	50.
95-47-6	TOTAL XYLENES	ND	10.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3D-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V20
SAMPLE AMOUNT: 5UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5000.
71-43-2	BENZENE	ND	1000.
75-27-4	BROMODICHLOROMETHANE	ND	1000.
75-25-2	BROMOFORM	ND	1000.
74-83-9	BROMOMETHANE	ND	5000.
78-93-3	2-BUTANONE (MEK)	ND	5000.
75-15-0	CARBON DISULFIDE	ND	1000.
56-23-5	CARBON TETRACHLORIDE	ND	1000.
108-90-7	CHLOROBENZENE	ND	1000.
75-00-3	CHLOROETHANE	ND	5000.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10000.
67-66-3	CHLOROFORM	ND	1000.
74-87-3	CHLOROMETHANE	ND	5000.
108-41-8	CHLOROTOLUENE	ND	1000.
124-48-1	DIBROMOCHLOROMETHANE	ND	1000.
95-50-1	1,2-DICHLOROBENZENE	ND	1000.
541-73-1	1,3-DICHLOROBENZENE	ND	1000.
106-46-7	1,4-DICHLOROBENZENE	ND	1000.
75-34-3	1,1-DICHLOROETHANE	ND	1000.
107-06-2	1,2-DICHLOROETHANE	ND	1000.
75-35-4	1,1-DICHLOROETHYLENE	56000.	1000.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1000.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1000.
78-87-5	1,2-DICHLOROPROPANE	ND	1000.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1000.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1000.
100-41-4	ETHYLBENZENE	ND	1000.
106-93-4	ETHYLENE DIBROMIDE	ND	1000.
76-13-1	FREON-TF	ND	1000.
119-78-6	2-HEXANONE	ND	5000.
75-09-2	METHYLENE CHLORIDE	ND	5000.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5000.
100-42-5	STYRENE	ND	1000.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1000.
127-18-4	TETRACHLOROETHYLENE	ND	1000.
109-99-9	TETRAHYDROFURAN	ND	5000.
108-88-3	TOLUENE	56000.	1000.
71-55-6	1,1,1-TRICHLOROETHANE	78000.	1000.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1000.
79-01-6	TRICHLOROETHYLENE	6000.	1000.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1000.
108-05-4	VINYL ACETATE	ND	5000.
75-01-4	VINYL CHLORIDE	ND	5000.
95-47-6	TOTAL XYLENES	ND	1000.

WCS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3S-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
1 UNIDENTIFIED COMPOUND	VOA	10000.

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3S-2R

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V21
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3S-2R

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-4S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V22
SAMPLE AMOUNT: 1ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	360.	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	15.	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	7.	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	410.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-4S-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====	=====	=====
1 UNIDENTIFIED COMPOUND	VOA	300.

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-5S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V29
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	4.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	12.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-5S-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-5S-2R

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V24
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-5S-2R

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-7S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V25
SAMPLE AMOUNT: 200UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET. LIMIT
67-64-1	ACETONE	ND	100.
71-43-2	BENZENE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	30.
75-25-2	BROMOFORM	ND	30.
74-83-9	BROMOMETHANE	ND	100.
78-93-3	2-BUTANONE (MEK)	ND	100.
75-15-0	CARBON DISULFIDE	ND	30.
56-23-5	CARBON TETRACHLORIDE	ND	30.
108-90-7	CHLOROBENZENE	ND	30.
75-00-3	CHLOROETHANE	ND	100.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	300.
67-66-3	CHLOROFORM	ND	30.
74-87-3	CHLOROMETHANE	ND	100.
108-41-8	CHLOROTOLUENE	ND	30.
124-48-1	DIBROMOCHLOROMETHANE	ND	30.
95-50-1	1,2-DICHLOROBENZENE	ND	30.
541-73-1	1,3-DICHLOROBENZENE	ND	30.
106-46-7	1,4-DICHLOROBENZENE	ND	30.
75-34-3	1,1-DICHLOROETHANE	ND	30.
107-06-2	1,2-DICHLOROETHANE	ND	30.
75-35-4	1,1-DICHLOROETHYLENE	1100.	30.
156-59-4	CIS-1,2-DICHLOROETHYLENE	31.	30.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	30.
78-87-5	1,2-DICHLOROPROPANE	ND	30.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	30.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	30.
100-41-4	ETHYLBENZENE	ND	30.
106-93-4	ETHYLENE DIBROMIDE	ND	30.
76-13-1	FREON-TF	ND	30.
119-78-6	2-HEXANONE	ND	100.
75-09-2	METHYLENE CHLORIDE	ND	100.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	100.
100-42-5	STYRENE	ND	30.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	30.
127-18-4	TETRACHLOROETHYLENE	ND	30.
109-99-9	TETRAHYDROFURAN	ND	100.
108-88-3	TOLUENE	ND	30.
71-55-6	1,1,1-TRICHLOROETHANE	66.	30.
79-00-5	1,1,2-TRICHLOROETHANE	ND	30.
79-01-6	TRICHLOROETHYLENE	1400.	30.
75-69-4	TRICHLOROFLUOROMETHANE	ND	30.
108-05-4	VINYL ACETATE	ND	100.
75-01-4	VINYL CHLORIDE	ND	100.
95-47-6	TOTAL XYLENES	ND	30.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-7S-2A

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCCS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-8S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V26
SAMPLE AMOUNT: 1ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	820.	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	7.	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	130.	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	430.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-8S-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-10S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V27
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	4.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	4.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
100-93-4	ETHYLENE DIBROMIDE	ND	1.
100-13-1	FREON-TF	ND	1.
100-78-6	2-HEXANONE	ND	5.
100-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	81.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-10S-2A

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-10S-2R

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V28
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
78-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-10S-2R

UNITS: UG/L (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

Data Reporting Qualifiers

- Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.
- ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.
- TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

WGS



CHAIN OF CUSTODY RECORD

PROJECT NAME: Douglas Aircraft Co. (C6)DATE 8/23/89PROJECT NO.: 8941263 J - TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
WCC-1S-2A	WCC-1S	WATER	BULKED	STRUCTURE	ICE	NONE	
WCC-1S-2B							
WCC-1S-2C				4 oz glass			
WCC-1S-2R				40 mL VOA			
WCC-1S-2S							
WCC-2S-2A	WCC-2S						
WCC-2S-2B							
WCC-2S-2C				4 oz glass			
WCC-2S-2R				40 mL VOA			
WCC-2S-2S							
WCC-3S-2A	WCC-3S						
WCC-3S-2B							
WCC-3S-2C				4 oz glass			
WCC-3S-2R				40 mL VOA			
WCC-3S-2S							
WCC-4S-2A	WCC-4S						
WCC-4S-2B							
WCC-4S-2C				4 oz glass			
WCC-4S-2R				40 mL VOA			
WCC-4S-2S							

Total Number of Samples Shipped:

Sampler's Signature: [Signature]

Relinquished By: [Signature]
 Signature: Peter Griesman
 Printed Name: Peter Griesman
 Company: WCC
 Reason: for outside delivery to WCC

Received By: [Signature]
 Signature: [Signature]
 Printed Name: [Signature]
 Company: [Signature]

Date

8/24/89

Time

8:00 AM

Relinquished By: [Signature]
 Signature: [Signature]
 Printed Name: [Signature]
 Company: A-1
 Reason:

Received By: [Signature]
 Signature: [Signature]
 Printed Name: [Signature]
 Company: WCC

Date

8/24/89

Time

11:00 AM

Relinquished By:
 Signature:
 Printed Name:
 Company:
 Reason:

Received By:
 Signature:
 Printed Name:
 Company:

Date

1/1

Time

Relinquished By:
 Signature:
 Printed Name:
 Company:
 Reason:

Received By:
 Signature:
 Printed Name:
 Company:

Date

1/1

Time

Special Shipment / Handling / Storage Requirements:

b13533

* Note - This does not constitute authorization to proceed with analysis

Woodward-Clyde Consultants



SHIPMENT NO.:

CHAIN OF CUSTODY RECORD

PAGE 2 OF 3

PROJECT NAME: Douglas Aircraft Co. (CG)

DATE 8/23/89

PROJECT NO.: 89418631 - TASK 1

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
WCC-5S-2A	WCC-5S	NO WATER PAPER		40 mL	ICE	NONE	
WCC-5S-2B							
WCC-5S-2C				4 oz. glass			
WCC-5S-2R				40 mL VOA			
WCC-5S-2S	↓			↓			
WCC-7S-2A	WCC-7S			↓			
WCC-7S-2B				↓			
WCC-7S-2C				4 oz. glass			
WCC-7S-2R				40 mL VOA			
WCC-7S-2S	↓			↓			
WCC-8S-2A	WCC-8S			↓			
WCC-8S-2B				↓			
WCC-8S-2C				4 oz. glass			
WCC-8S-2R				40 mL VOA			
WCC-8S-2S	↓			↓			
WCC-10S-2A	WCC-10S			↓			
WCC-10S-2B				↓			
WCC-10S-2C				4 oz. glass			
WCC-10S-2R				40 mL VOA			
WCC-10S-2S	↓			↓			

Total Number of Samples Shipped:

Sampler's Signature: Peter Giesman

Relinquished By:
Signature: Peter Giesman
Printed Name: Peter Giesman
Company: WCC
Reason: for delivery to WCCS

Received By:
Signature: Bill Fies
Printed Name: Bill Fies
Company: WCCS

Date: 8/24/89
Time: 8:00

Relinquished By:
Signature: Bill Fies
Printed Name: Bill Fies
Company: WCCS
Reason: for delivery to WCCS

Received By:
Signature: Muri Cederwall
Printed Name: Muri Cederwall
Company: WCCS

Date: 8/24/89
Time: 11:00 AM

Relinquished By:
Signature:
Printed Name:
Company:
Reason:

Received By:
Signature:
Printed Name:
Company:

Date: 1/1
Time:

Relinquished By:
Signature:
Printed Name:
Company:
Reason:

Received By:
Signature:
Printed Name:
Company:

Date: 1/1
Time:

Special Shipment / Handling / Storage Requirements:

13533

* Note - This does not constitute authorization to proceed with analysis

LA/OR-0183-421



PAGE 3 OF 3

DATE 8 1231 89

PROJECT NAME: Douglas Aircraft Co. (C6)

PROJECT NO.: 89418631 - TASK 1

Total Number of Samples Shipped:		Sampler's Signature:			
Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>Peter Glaesner</u> Company: <u>WCC</u> Reason: <u>Sample Delivery to WCCS</u>		Received By: Signature: <u>[Signature]</u> Printed Name: <u>P-H GAG</u> Company: <u>R-1</u>		Date <u>9-12-15</u> <hr/> Time <u>9:00</u>	
Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>R. R. R.</u> Company: <u>R-1</u> Reason: _____		Received By: Signature: <u>[Signature]</u> Printed Name: <u>Mary Cederwall</u> Company: <u>WCCS</u>		Date <u>3-24-19</u> <hr/> Time <u>11:26 AM</u>	
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____		Received By: Signature: _____ Printed Name: _____ Company: _____		Date <u>1 / 1</u> <hr/> Time _____	
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____		Received By: Signature: _____ Printed Name: _____ Company: _____		Date <u>1 / 1</u> <hr/> Time _____	

Special Shipment / Handling / Storage Requirements:

10 13538

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

BOE-C6-0092352

September 29, 1989

RECEIVED

DET 0 4 10
WCC-SANTA ANA



WEST COAST
ANALYTICAL
SERVICE, INC.

ANALYTICAL CHEMISTS

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 13764

A

LABORATORY REPORT

Samples Received: Thirteen (13) soils
Date Received: 9-25-89
Purchase Order No: Proj#: 8941863J-I/Douglas Aircraft

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Three (3) soils	Volatile Organics by EPA 8240	Data Sheets

Page 1 of 1

A handwritten signature in cursive script, reading "B. Michael Hovanec".

B. Michael Hovanec
Senior Staff Chemist

A handwritten signature in cursive script, reading "D.J. Northington".

D.J. Northington, Ph.D.
Technical Director

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

RECEIVED

SAMPLE: 6S-8-4

OCT 04 1989

DATE RECEIVED: 09/25/89
DATE EXTRACTED: 09/29/89
DATE ANALYZED: 09/29/89

WCC-SANTA ANA RUN NUMBER: 13764V4
SAMPLE AMOUNT: 0.1G
MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	300.
71-43-2	BENZENE	ND	50.
75-27-4	BROMODICHLOROMETHANE	ND	50.
75-25-2	BROMOFORM	ND	50.
74-83-9	BROMOMETHANE	ND	300.
78-93-3	2-BUTANONE (MEK)	9400.	300.
75-15-0	CARBON DISULFIDE	ND	50.
56-23-5	CARBON TETRACHLORIDE	ND	50.
108-90-7	CHLOROBENZENE	ND	50.
75-00-3	CHLOROETHANE	ND	300.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	500.
67-66-3	CHLOROFORM	ND	50.
74-87-3	CHLOROMETHANE	ND	300.
108-41-8	CHLOROTOLUENE	ND	50.
124-48-1	DIBROMOCHLOROMETHANE	ND	50.
95-50-1	1,2-DICHLOROBENZENE	ND	50.
541-73-1	1,3-DICHLOROBENZENE	ND	50.
106-46-7	1,4-DICHLOROBENZENE	ND	50.
75-34-3	1,1-DICHLOROETHANE	ND	50.
107-06-2	1,2-DICHLOROETHANE	ND	50.
75-35-4	1,1-DICHLOROETHYLENE	ND	50.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	50.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	50.
78-87-5	1,2-DICHLOROPROPANE	ND	50.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	50.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	50.
100-41-4	ETHYLBENZENE	ND	50.
106-93-4	ETHYLENE DIBROMIDE	ND	50.
76-13-1	FREON-TF	ND	50.
119-78-6	2-HEXANONE	ND	300.
75-09-2	METHYLENE CHLORIDE	ND	300.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	8400.	300.
100-42-5	STYRENE	ND	50.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	50.
127-18-4	TETRACHLOROETHYLENE	ND	50.
109-99-9	TETRAHYDROFURAN	ND	300.
108-88-3	TOLUENE	1000.	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	50.
79-00-5	1,1,2-TRICHLOROETHANE	ND	50.
79-01-6	TRICHLOROETHYLENE	ND	50.
75-69-4	TRICHLOROFLUOROMETHANE	ND	50.
108-05-4	VINYL ACETATE	ND	300.
75-01-4	VINYL CHLORIDE	ND	300.
95-47-6	TOTAL XYLENES	ND	50.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-8-4

UNITS: UG/KG (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
1 BUTYL CELLOSOLVE	VOA	300.

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-9-4

DATE RECEIVED: 09/25/89
DATE EXTRACTED: 09/29/89
DATE ANALYZED: 09/29/89

RUN NUMBER: 13764V2
SAMPLE AMOUNT: 0.1G
MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	300.
71-43-2	BENZENE	ND	50.
75-27-4	BROMODICHLOROMETHANE	ND	50.
75-25-2	BROMOFORM	ND	50.
74-83-9	BROMOMETHANE	ND	300.
78-93-3	2-BUTANONE (MEK)	9200.	300.
75-15-0	CARBON DISULFIDE	ND	50.
56-23-5	CARBON TETRACHLORIDE	ND	50.
108-90-7	CHLOROBENZENE	ND	50.
75-00-3	CHLOROETHANE	ND	300.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	500.
67-66-3	CHLOROFORM	ND	50.
74-87-3	CHLOROMETHANE	ND	300.
108-41-8	CHLOROTOLUENE	ND	50.
124-48-1	DIBROMOCHLOROMETHANE	ND	50.
95-50-1	1,2-DICHLOROBENZENE	ND	50.
541-73-1	1,3-DICHLOROBENZENE	ND	50.
106-46-7	1,4-DICHLOROBENZENE	ND	50.
75-34-3	1,1-DICHLOROETHANE	ND	50.
107-06-2	1,2-DICHLOROETHANE	ND	50.
75-35-4	1,1-DICHLOROETHYLENE	240.	50.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	50.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	50.
78-87-5	1,2-DICHLOROPROPANE	ND	50.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	50.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	50.
100-41-4	ETHYLBENZENE	ND	50.
106-93-4	ETHYLENE DIBROMIDE	ND	50.
76-13-1	FREON-TF	ND	50.
119-78-6	2-HEXANONE	ND	300.
75-09-2	METHYLENE CHLORIDE	ND	300.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	2500.	300.
100-42-5	STYRENE	ND	50.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	50.
127-18-4	TETRACHLOROETHYLENE	ND	50.
109-99-9	TETRAHYDROFURAN	ND	300.
108-88-3	TOLUENE	2200.	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	50.
79-00-5	1,1,2-TRICHLOROETHANE	ND	50.
79-01-6	TRICHLOROETHYLENE	83.	50.
75-69-4	TRICHLOROFLUOROMETHANE	ND	50.
108-05-4	VINYL ACETATE	ND	300.
75-01-4	VINYL CHLORIDE	ND	300.
95-47-6	TOTAL XYLENES	ND	50.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-9-4

UNITS: UG/KG (PPB)
APPROXIMATE

COMPOUND NAME	FRACTION	CONCENTRATION
1 BUTYL CELLOSOLVE	VOA	700.

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-10-4

DATE RECEIVED: 09/25/89
DATE EXTRACTED: 09/29/89
DATE ANALYZED: 09/29/89

RUN NUMBER: 13764V1
SAMPLE AMOUNT: 1.0G
MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	550.	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	ND	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	330.	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	150.	5.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	7.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-10-4

UNITS: UG/KG (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

Data Reporting Qualifiers

- Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.
- ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.
- TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

WCIS

RECEIVED

Woodward-Clyde Consultants



SHIPMENT NO.: 1

OCT 20 1989

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

WCC-SANTA ANA

PROJECT NAME: DOUGLAS AIRCRAFT CO.

DATE 9 12 1989

PROJECT NO.: 894-863-J - T

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
1	WINGS	SOIL		200-15 TUBE	ICE	NONE	100%
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Total Number of Samples Shipped: 13 Sampler's Signature: [Signature]

Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u> Reason: <u>[Reason]</u>	Received By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u>	Date: <u>10/1/89</u> Time: <u>10:00</u>
Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u> Reason: <u>[Reason]</u>	Received By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u>	Date: <u>10/1/89</u> Time: <u>10:00</u>
Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u> Reason: <u>[Reason]</u>	Received By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u>	Date: <u>10/1/89</u> Time: <u>10:00</u>
Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u> Reason: <u>[Reason]</u>	Received By: Signature: <u>[Signature]</u> Printed Name: <u>[Name]</u> Company: <u>[Company]</u>	Date: <u>10/1/89</u> Time: <u>10:00</u>

Special Shipment / Handling / Storage Requirements:

13764

* Note - This does not constitute authorization to proceed with analysis

October 18, 1989

RECEIVED

OCT 19 1989

WCC-SANTA ANA

WCAS

**WEST COAST
ANALYTICAL
SERVICE, INC.**

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Dr.
Santa Ana, CA 92705

Attn: Dr. Alistaire Callender

JOB NO. 13882


LABORATORY REPORT

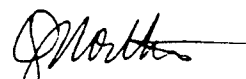
Samples Received: Three (3) liquids in quadruplicate
Date Received: 10-9-89
Date Released for Analysis: 10-11-89
Purchase Order No: Proj#: 8941863J/Douglas Aircraft

The samples were analyzed as follows:

<u>Samples Analyzed</u>	<u>Analysis</u>	<u>Results</u>
Three (3) liquids	Volatile Organics by EPA 624	Data Sheets

Page 1 of 1

for 
Michael Shelton
Senior Chemist


D. J. Northington, Ph.D.
Technical Director

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13882

SAMPLE: WCC-6S-1A

DATE RECEIVED: 10/09/89
DATE EXTRACTED: 10/17/89
DATE ANALYZED: 10/17/89

RUN NUMBER: 13882V5
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	4.	1.
107-06-2	1,2-DICHLOROETHANE	3.	1.
75-35-4	1,1-DICHLOROETHYLENE	210.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	12.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	7.	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	130.	1.
79-00-5	1,1,2-TRICHLOROETHANE	4.	1.
79-01-6	TRICHLOROETHYLENE	140.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-6S-1A
WCAS JOB #: 13882

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13882

SAMPLE: WCC-9S-1A

DATE RECEIVED: 10/09/89
DATE EXTRACTED: 10/17/89
DATE ANALYZED: 10/17/89

RUN NUMBER: 13882V7
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	7.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	2.	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	15.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-9S-1A
WCAS JOB #: 13882

COMPOUND NAME	FRACTION	UNITS: UG/L (PPB) APPROXIMATE CONCENTRATION
=====	=====	=====
1 NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-12S-1A
WCAS JOB #: 13882

DATE RECEIVED: 10/09/89
DATE EXTRACTED: 10/17/89
DATE ANALYZED: 10/17/89

RUN NUMBER: 13882V8
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	4.	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-12S-1A
WCAS JOB #: 13882

UNITS: UG/L (PPB)

COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
=====		
1 NONE FOUND	VOA	

WCAS

Data Reporting Qualifiers

- Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.
- ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.
- TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

WCAS



PAGE 1 OF 1

DATE 10 / 6 / 89

PROJECT NAME: Douglas Aircraft Co.

PROJECT NO.: 8741863 J

Total Number of Samples Shipped: 17	Sampler's Signature:
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Relinquished By:	Signature_____	Received By:	Signature_____	Date / /
	Printed Name_____		Printed Name_____	Time :
	Company_____		Company_____	
	Reason_____			

Special Shipment / Handling / Storage Requirements:

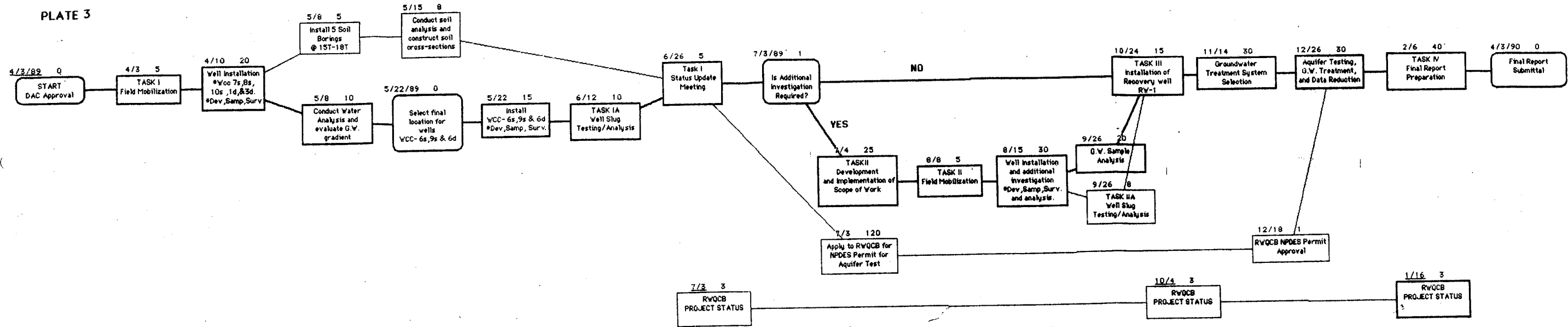
CONTACT: Peter Glasman or Alistaire Calver (714) 835-6886

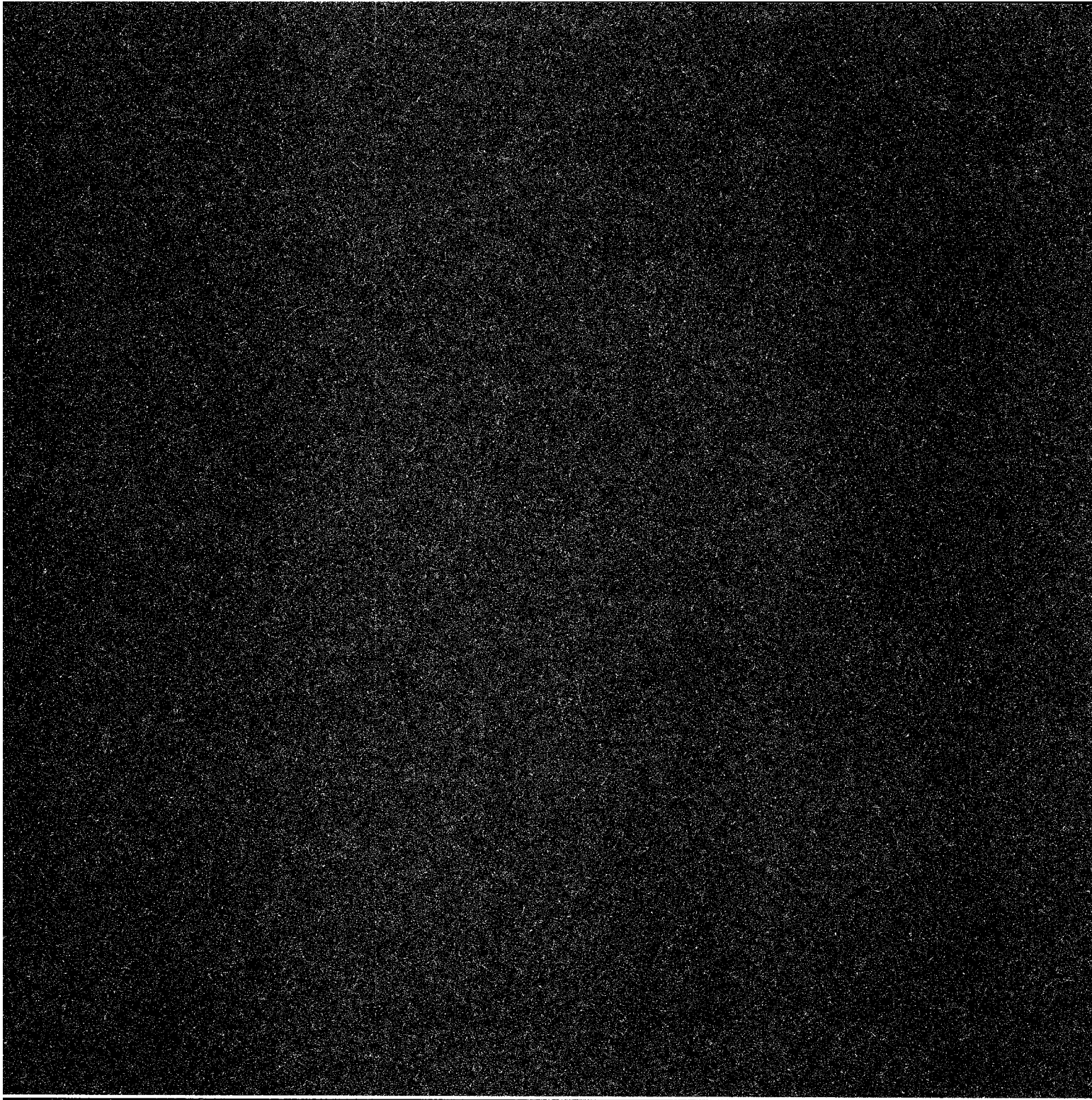
* Note - This does not constitute authorization to proceed with analysis

LA OB-0183-421

**RWQCB
DOUGLAS AIRCRAFT (C6) TORRANCE FACILITY
PHASE III SOIL AND GROUNDWATER FLOWCHART**

PLATE 3





MCDONNELL DOUGLAS 
3855 Lakewood Boulevard, Long Beach, California 90846